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FACTORS AFFECTING PRODUCT LIFETIME

A STUDY IN SUPPORT OF POLICY DEVELOPMENT FOR WASTE REDUCTION

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UNIVERSITY OF CALIFORNIA, LOS ANGELES

W. David Conn, Principal Investigator

School of Architecture and Urban Planning
University of California, Los Angeles, California 90024

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ABSTRACT

An exploratory study has examined factors affecting the lifetimes of selected small electrical appliances, to assist in the development of policies to extend these lifetimes (for the purposes of conserving resources, protecting the environment, and reducing the costs of solid waste management). The study included (i) a consumer survey, (ii) in-depth interviews with manufacturers, and (iii) a limited investigation of second-hand markets. Tentative findings are that physical durability appears to be a key factor affecting the lifetimes of a few of the products examined (particularly those that malfunction after less than three years' use) while the lifetimes of other products seem more dependent on the consumers' desire for change (a desire that is fostered to some extent by the manufacturers). Selected policy options are reviewed.

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EXECUTIVE SUMMARY

Introduction

Concern over problems of resource depletion and environmental damage, as well as over the ever-increasing costs of disposing of solid wastes, has led to a search for new approaches to managing these wastes. One possibility under consideration is that of extending the lifetimes of durable products, in the hope of slowing both the generation of discards and the demand for replacements. Although it has been shown that the manufacture, use, and disposal of more durable products could, under some circumstances, entail a higher rather than lower intensity of materials and energy use, nevertheless, the extension of product lifetimes seems likely in many cases to offer resource and environmental benefits.

Assuming that policy-makers, for this or any other reason, might wish to extend the lifetimes of durable products (and this study has not addressed the value-laden question of how long an "optimal" lifetime would be), it is important for them to understand the key factors that determine these lifetimes. In the absence of this information, some legislators have already begun to press for government action to influence product lifetimes.

Many policy measures proposed, such as durability standards, product labeling, and requirements for longer warranty periods, seem to be aimed at persuading the manufacturers, directly or indirectly, to product products that are physically more durable. However, it is not clear that the physical durability built in by a manufacturer is necessarily the sole or even a major determinant of a product's lifetime in use. The latter is likely to be influenced by the decisions and actions not only of the manufacturers, but also of the distributors, repair industries, taxing and regulatory authorities, and (perhaps most importantly) the consumers themselves.

In order to assist policy-makers in this poorly understood area, a research project sponsored by the National Science Foundation has sought information on "Factors Affecting Product Lifetime". The research included:

(i) a survey of consumers to obtain information about their acquisition and disposal of a selected set of durable products;

(ii) in-depth interviews with firms engaged in the manufacture and distribution of the same set of products; and

(iii) a limited investigation of second-hand markets (on the grounds that these provide a means for transferring products from owners who no longer use them to prospective new users who may thereby extend their lifetimes).

Nature of the Study

The study was exploratory. It covered a selected set of products, namely small household electrical appliances, as listed in table I. One of the reasons for this choice was that typically these particular products, while relatively inexpensive to purchase, are rather expensive to repair; thus consumers may be quick to discard them as soon as they break down (for whatever reason). If products are classified on a spectrum from "durable" to "non-durable", it may be that these appliances (in the consumers' perception) are moving toward the "non-durable" end of the spectrum. This being so, they symbolize a trend that is contrary to the notion of waste reduction.

The study was conducted in a limited geographic area, in and around the City of Santa Monica, California. Although this city has a mix of population, ethnic, income, housing, and other characteristics that is thought to be reasonably representative of many major communities throughout the U.S., it is recognized that the findings of the study may have a regional bias; for example, the prevalence of certain second-hand markets, such as garage sales, might be influenced by climatic factors.

TABLE I
PRODUCTS COVERED IN THE STUDY

Toaster
Toaster Oven
Can Opener
Blender
Coffee Maker
Skillet
Mixer
Bonnet Hairdryer
Blow Hairdryer
Electric Toothbrush
Iron
Vacuum Cleaner
Radio
Television (black and white)

Consumer Survey

Introduction. In the initial phase of the consumer survey, a randomly selected

sample of households was screened by telephone to identify those that had disposed of one or more of the products under investigation during the past twelve months. "Disposing" in this context did not necessarily mean "throwing away" but rather referred to the termination of a product's useful life within the household. Table II lists the options that fell within the definition of "disposal" for the purpose of the study. Of the 3,291 dwellings to which calls were placed, contact was made with 2,682 and a total of 1,893 persons answered the screener questions. Of those who answered, 33 percent (629) had disposed of one or more of the products under study. A total of 506 agreed to be interviewed; 311 interviews were completed.

TABLE II
DISPOSAL OPTIONS CONSIDERED IN THE STUDY

Store (with no definite intention of re-use)
Throw Away
Give to Friend or Relative
Donate to Charity
Sell
Trade-in

The questionnaire used in the home interview had two main parts. The first part sought information on consumer behavior regarding the purchase, maintenance, and disposal of one particular good (from the list of fourteen) discarded by the respondent within the past year. This part of the questionnaire was designed to be administered by professional interviewers. The second part of the questionnaire sought information on consumer attitudes regarding the purchase, maintenance, and disposal of all small electrical products. The questionnaire also sought data on the socioeconomic characteristics of the sample: the age, sex, family income, family size, ethnicity, and education level of each respondent.

General findings. The following general findings, based on frequency data, resulted from the consumer survey:

(i) "Store" and "throw away" were the options most frequently chosen. These options are thought more likely to signify the end of the product's useful lifetime than the other four options. Table III shows the frequency distribution of the six disposal options.

TABLE III
DISPOSAL OPTION FREQUENCY DISTRIBUTION

Option	Percent
Stored	41
Thrown Away	21
Given Away	18
Donated	11
Sold	7
Traded-in	2

Total number of respondents = 311

(ii) The disposal of products generally occurred because: 1) products were broken, 2) respondents preferred new ones, or 3) respondents had no use for their old products.

(iii) Half of the respondents obtained replacements for the products discarded; 70 percent of the replacements were purchased (30 percent were gifts).

(iv) Only 10 percent of the discarded products had been obtained "used".

(v) Over 50 percent of the products had cost under $25. The price and quality of products, as indicated by respondents, were mostly comparable to other similar products on the market.

(vi) 54 percent of the products needed repair when discarded.

(vii) Products were used an average of 6.59 years (a median of 4.67 years).

(viii) Factors most important to the respondents' purchase decisions were performance, reliability, and durability. It appears that information on these characteristics was based primarily on the manufacturers' reputations and personal experience.

(ix) Few respondents kept track of the instructions accompanying their products.

Disposal option and product type. The study attempted to provide insight into why respondents chose a particular disposal option by examining the various product types in detail. Unfortunately, the sample sizes for some of the product types were extremely small, necessitating the use of extra caution in drawing conclusions. Because of this problem, for some parts of the analysis, certain individual products were grouped together in categories comprising:

(i) kitchen aid items;

(ii) personal care items.

Vacuum cleaners, due to their price range and particular nature of use, were

treated as a separate category, while televisions, radios, and irons were excluded from this second level of analysis.*

The following findings were made regarding the relationship between product type and disposal option choice:

(i) Products thrown away generally did not work when discarded, but 64 percent of the products that needed repair were not thrown away.

(ii) Blow dryers, irons, and coffee makers were thrown away most often.

(iii) Nearly half of those products that were stored were in working condition. These products may have belonged to respondents who had no use for their products or who preferred new ones.

(iv) Kitchen aid items and vacuum cleaners were used longer, and were less likely to be thrown away, than personal care items.

(v) Products that generally cost over $30 (black and white televisions, vacuum cleaners, and toaster ovens) were seldom thrown away. For products costing $30 and less the effect of price on disposal option was unclear.

(vi) Respondents considered reliability to be important more often in their decisions to buy kitchen aid products than in their decisions to buy personal care items and vacuum cleaners.

(vii) Appearance and instructions also were considered important more often in decisions to buy kitchen aid products than in decisions to buy other products.

(viii) Blow dryers and vacuum cleaners were replaced**most frequently. The majority of several types of kitchen appliances (toaster ovens, mixers, can openers, blenders, and skillets) were not replaced.

(ix) Product types most often obtained used rather than new were vacuum cleaners (25 percent obtained used) and bonnet hairdryers (22 percent).

(x) Respondents were dissatisfied most often with blow dryers, can openers, bonnet hairdryers, toaster ovens, and blenders, although the majority of respondents for each product type were satisfied with the amount of use obtained from their products.

Disposal option and price. Having examined the extent to which product type could explain the choice of disposal option, the study then went on to consider relationships among other variables, with an emphasis on price.

The socioeconomic variables -- education, income, ethnicity, sex, and age -- proved unimportant in consumer disposal option decisions. However,

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* This was because they cannot sensibly be grouped in the other categories, while televisions and radios differ too much in price to be grouped together.

** By "replaced" it was meant that another appliance in the same product category had been acquired.

significant age differences were found in the years of product use, a variable that differed significantly with disposal option (see below).

The study found significant associations between the disposal option variable and the following independent variables:

(i) product type (as discussed above);

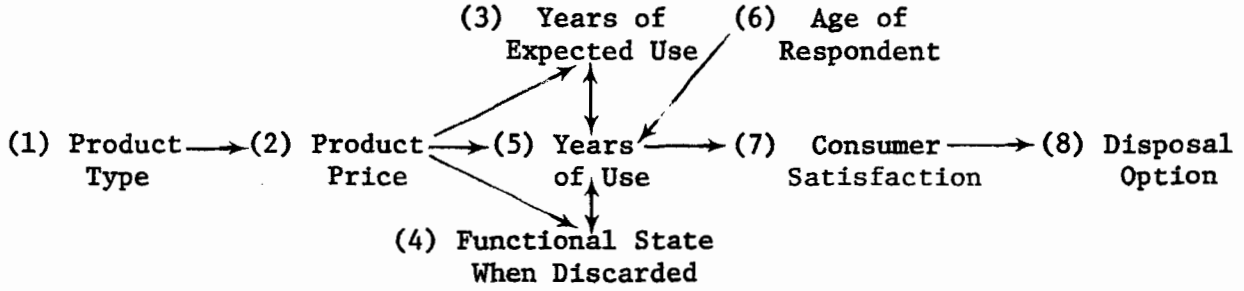
(ii) product price;

(iii) functional state of the product when discarded (i.e., whether it needed repair); and

(iv) consumer satisfaction with the length of product use.

Some variation was also found among the disposal options for the variables "years of use" and "years of expected use". It was hypothesized that product type and perhaps product price might be the original independent variables, since they were established prior to the other variables, being determined at the point of purchase. The other variables may help explain the associations of product price and type to disposal option. Figure I shows the possible sequential order and relationships of these variables.

FIGURE I
VARIABLES LEADING TO DISPOSAL OPTION



Findings from the study regarding the relationships among these factors include the following:

(i) Thrown away items almost always needed repair, had been used fewer years than the other products, and generally were inexpensive.

(ii) Stored items, while frequently needing repair, were used longer than thrown away items.

(iii) Items used less than three years generally had cost less than $30.

(iv) Items disposed of in a manner that increased their chances of continued use tended to be relatively expensive, in working order when discarded, and older -- they had more years of use.

(v) Older respondents used products longer than younger respondents.

(vi) Consumers were likely to be dissatisfied with products that lasted three years or less.

Consumer attitudes and behavior affecting product durability. The first part of the questionnaire focused on how each respondent acquired, used, and disposed of a particular small electrical appliance. The second part of the questionnaire sought information on consumer attitudes toward the use and disposal of small electrical appliances generally. On the subject of product durability, the opinions expressed by respondents in this latter section often appeared to contradict those implied by the specific actions of the respondents in determining the lifetime of particular products. By comparing the actions of consumers with their expressed opinions, a clearer picture could be drawn of how consumers might respond to changes in product durability, prices, and information.

The disparity between consumer actions and their opinions, as evidenced by the survey results, is important in relation to three basic issues, namely:

(i) whether, if products were to be made more durable (through technical innovations) without any increase in price, consumers would use these products longer;

(ii) whether, if more durable products were to cost more, consumers would be willing to pay the higher prices, and whether they would use their products longer; and

(iii) whether, if more information on product durability were made available to consumers, they would use this information when making purchase decisions.

By comparing the behavioral responses of consumers toward specific products, and the attitudinal responses of consumers for all small electrical appliances generally, the following findings were made:

(i) Consumers were often dissatisfied with products that lasted less than three years.

(ii) It is not clear how long products must last for consumers to consider them sufficiently durable, but the products of "satisfied" consumers lasted an average of 7.7 years.

(iii) About 25 percent of the respondents disposed of their products because they preferred new ones.

(iv) Extending product durability presumably would have had no effect on the 25 percent of respondents who had no use for the products they discarded.

(v) While more expensive items were used longer, it is not clear if and how much respondents would have been willing to pay for more durable products. Generally respondents looked for "the best buy for the money".

(vi) While people claimed that they follow instructions accompanying products, few kept track of the instructions which came with their now-discarded products.

(vii) It appears that the manufacturer's reputation and personal experience were the sources most frequently relied on for information about product durability.

Further analysis of attitude statements. The attitude statements were further analyzed in an attempt to discover variables that would distinguish among individuals who choose different means of disposing of small electrical appliances, with the intent of developing profiles of the consumers in the segments.

Two stages of analysis were conducted: first, a factor analysis of the attitude statements to reduce the data; and second, a discriminant analysis to identify the distinguishing variables. The factors which emerged in the first stage were used to generate factor scores which served as independent "lifestyle" variables in the discriminant analysis, both separately and in combination with demographic variables.

The results of these analyses are summarized below:

(i) An eight factor solution accounted for 44.4 percent of the variance in the responses to the attitudinal (or lifestyle) questions. Seven of the factors (the eighth factor captured error variance) were summarized and assigned names such as "Cynics", Hedonists", "Pack Rats", etc.

(ii) These lifestyle factors served as independent variables in the linear discriminant analyses, to see if they could distinguish among the various disposal options. The results indicated that the independent variables were able to differentiate only between the group who threw products away and the group who chose one of the other disposal options (stored, sold, donated, traded-in, gave away).

(iii) Age appeared to be an important demographic variable in differentiating between those who threw products away and those who chose one of the other disposal options.

(iv) The profile that emerges from these analyses as one who throws a product away is a younger individual (than the others disposing of products) who has a tendency to throw products away as soon as any part malfunctions.

Product repair. Factors affecting consumers' decisions to have non-functioning products repaired were examined in the hope of determining why 54 percent of the respondents had disposed of products needing repair. Only 30 percent of these respondents had even considered repairing their products. The data further revealed that:

(i) Nearly 70 percent of the consumers had disposed of non-functioning products and had not considered repairing because they believed it would be too expensive, too inconvenient, or impossible to repair their products.

(ii) Respondents who had disposed of non-functioning products tended to be evenly distributed among different income groups and different ethnic backgrounds. However, elderly people seem to have disposed of functioning products more frequently than adults or young people (although the elderly used products longer then other age groups).

(iii) Inexpensive products (below $30) tended to be disposed of in a non-functioning state more frequently than expensive products, although the disposal of products needing repair showed signs of increasing again as the purchase price rose above $100.

(iv) The hypothesis that the ratio of repair cost to initial purchase price might have been the criterion used to judge whether repair cost was "prohibitive" was not supported by the data.

(v) No significant relationship was found for all products linking repairs prior to disposal with initial purchase price, although it did appear that the more expensive products were more likely to have been repaired. There was no observable pattern for products costing less than $30.

Interviews with Manufacturers

Given that time and resources would not permit the identification and interviewing of all manufacturers of products covered in the study, the trade associations (AHAM and VCMA) were asked to suggest a number of companies that might together be expected to give a range of responses representative of the small appliance and vacuum cleaner industries as a whole (the television and radio industries were excluded from this part of the study due to limited resources). These companies were contacted directly and an outline was provided in advance of the kinds of questions that would be asked.

The interviews sought information on manufacturers' decisions and attitudes in regard to:

- planning for the introduction of new products and changes in existing products;
- factors influencing product design;
- factors relating to product durability;
- factors relating to product repairability;
- the operation of second-hand markets;
- consumer behavior in product acquisition and disposal; and
- policies designed to increase product lifetimes.

It is important to note that the company representatives interviewed held a variety of different positions in product management, testing, quality control, research and development, etc. Perspectives varied, and different people within the same company sometimes differed in their responses to some of the same questions. The following are some of the key points made by manufacturers of small appliances and vacuum cleaners:

(i) The industries are highly competitive, with the markets for many products at or near saturation. Continuous innovation was seen as essential to maintain market share and profitability.

(ii) The companies all claimed to respond to consumer needs. They suggested that "change" is a way of life for most Americans, although they conceded that industries do play a significant role in fostering this change.

(iii) Those interviewed rejected the suggestion that they might indulge in "product obsolescence" (that is, the introduction of needless innovations to promote consumer dissatisfaction with existing products). They argued that stylistic changes almost invariably accompany technological changes since the former are too expensive to introduce by themselves; however, since most of their products are bought "off-the-shelf", appearance is important in attracting customers already in the market.

(iv) It was agreed that products could be built to last longer; however, this would not only increase costs but might also impair other characteristics of the products. It was claimed that products are typically made as durable as possible, within price constraints based on marketing considerations.

(v) According to those interviewed, efforts are made to minimize the need for maintenance and repair of their products, although this need cannot be eliminated completely. Improvements are constantly being made to use and care instructions, although it was feared that too much attention given to problem avoidance would constitute "negative selling". Repairs by qualified personnel (as necessary) are encouraged and technically present no problems, but home repairs are deliberately discouraged, owing to safety and potential liability considerations. Although products are discontinued when demand falls, the manufacturers maintain spare parts for several years thereafter and the availability of parts was not thought to be a constraint on repair. However, it was pointed out that repair may not always be in a consumer's best interest, since it may be possible to purchase a later model of the same product at little or no additional cost; this is because mass production techniques can be used in the manufacture of new products while they are typically not applicable to repair (the latter being labor-intensive).

(vi) Most of the manufacturers have little or no involvement in second-hand markets for their products. Many viewed trade-in programs as marketing devices, pointing out the traded-in products are typically

discarded. Some manufacturers have re-building programs, but these are commonly limited to products that have been rejected during the manufacturing process or returned under warranty with minor flaws. There is, however, a significant market for re-built vacuum cleaners.*

Investigation of Second-Hand Markets

This part of the study focused on "formal" second-hand markets, i.e., structured channels for the transfer of used products (not including casual transfers between friends or relatives).

It was beyond the scope of the study to undertake a large-scale systematic examination of second-hand markets; rather, the limited resources available were used:

- to identify the market channels.
- to gain a reasonably reliable impression of the volume of small electrical appliances handled, and
- to understand the principal factors and constraints affecting the workings of the markets.

The research included interviews with market participants and other interested parties (e.g., the State Board of Equalization), field observation, and reviews of printed advertisements, tax records, and other pertinent documents.

Some of the key findings of the investigation of second-hand markets were as follows:

(i) Second-hand markets for small electrical appliances in the Santa Monica area include garage sales, swap meets, classified advertisements, thrift stores (privately and charitably operated), and retail stores accepting trade-ins and/or offering re-builts.

(ii) The volume of used small electrical appliances passing through these channels is relatively small, numbering in the tens or hundreds per month, compared with the thousands of new appliances sold monthly in the same city.**

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* There may also be a significant re-built market for televisions. However, television manufacturers were not interviewed in this part of the study.

** According to the 1976 U.S. Statistical Abstract (U.S. Department of Commerce, Bureau of the Census), total manufacturers' sales of new blenders, can openers, automatic coffee makers, frypan skillets, hairdryers, irons, automatic toasters, and vacuum cleaners for 1975 amounted to nearly 54 million units nationwide. Pro-rating by population (and neglecting exports), this suggests that about 2000 new units were sold monthly in Santa Monica during 1975.

(iii) The law requires that California sales tax should be collected for most sales in second-hand markets, but enforcement is lax in the less formal markets (such as garage sales).

(iv) One of the charitable organizations operating thrift stores (Goodwill Industries) is concerned less with the sale of second-hand products than with the training of previously "unemployable" persons to undertake the handling, cleaning-up, repair, etc., of these products. The organization, therefore, finds it worthwhile to repair some products that would otherwise have been thrown away by their previous owners (or by the operators of other thrift stores).

(v) Although there is wide variation, the appliances offered for sale in classified advertisements typically carry the highest prices, while those at garage sales and swap meets carry the lowest prices, with thrift stores in-between. This can be explained on the basis of the transaction costs involved.

(vi) Many of the appliances that enter a second-hand market ultimately pass through not one but several different channels, and some end up south of the U.S. border.

Policy Approaches to Increasing Product Lifetimes

Assuming that policy-makers might wish to increase the lifetimes of products covered in the study, a number of possible approaches were briefly reviewed. The review was based on information gathered in the three parts of the study, as well as additional information obtained from the literature, from contacts with government officials, etc.

It is important to re-emphasize that the study was intended to be exploratory rather than necessarily to provide definitive answers to the questions raised. Considerable caution must, therefore, be exercised in drawing policy implications directly from the results. Further investigation of some issues is necessary to remedy potential problems arising from the small sample size, possible geographical bias, etc.

Policy options for increasing physical durability. The study identified the following policies that might be used to promote the manufacture of physically more durable products:

(i) Regulations restricting the sale of products that fail to meet specified standards of durability (e.g., as provided for in the draft Solid Waste Utilization Act, circulated by the Congressional Subcommittee on Transportation and Commerce in 1975);

(ii) Economic disincentives penalizing those that fail to meet minimum durability standards or, more generally, discouraging short-lived products (e.g., the so-called "amortisation tax" as proposed by the editors of the Ecologist (1972), or possibly a variation of the

solid waste disposal charge currently being studied by the Federal Inter-Agency Resource Conservation Committee);

(iii) Certification by a government agency of the results of durability tests, with point-of-sale disclosure (e.g., as employed in the voluntary Consumer Product Information Labeling Program of the Department of Commerce, currently underway on a trial basis); and

(iv) Encouragement of participation in an industry-administered program of durability testing and disclosure (e.g., a program administered by a trade association such as AHAM or VCMA).

The study examined a key requirement of all these policies, namely that the products be tested for physical durability. No test protocol has been agreed upon yet that would be suitable for obtaining uniform lifetime data on all models of a product class. Approaches (iii) and (iv), above, also require disclosure of test results to consumers. Disclosure raises questions as to whether the information should come from a private, or public source, how consumers might most effectively be exposed to durability information, whether consumers would take this information into account when making purchases, and how to communicate to consumers the true nature of the test results.

Other considerations associated with increasing physical durability, as identified in the study, include:

- the impact on product prices and sales;
- the potential problem that policies might cause durability to be emphasized at the expense of other performance characteristics;
- the possibility that pressure might be exerted to set durability standards, if adopted, at the lowest commonly achieved level in the industry, thereby encouraging a reduction rather than an increase in average durability; and
- the potential problem that the increased costs of introducing a new product (due to the need for testing, etc.) might pose special difficulties for smaller companies.

Policy approaches for keeping products longer in service. Policies identified in the study which might persuade consumers to keep products longer in service include those that would:

(i) Encourage care/maintenance to forestall repair through:

- the improvement of instruction booklets and/or the attachment of more instructions to the products themselves (according to the survey, most were separate); and

- more extensive consumer education on product care/maintenance (e.g., by means of lessons in grade school, adult learning programs, educational television, consumer-oriented public service announcements, etc.).

(ii) Encourage repair when products are not functioning by:

- encouraging manufacturers to make products that are more readily repaired (possibly with more opportunity for home repairs, at least those of a minor nature that are unlikely to present hazards);
- requiring longer warranty periods or the availability of service contracts;
- requiring manufacturers and/or retailers to provide consumers with easier access to servicing facilities;
- encouraging greater standardization of parts;
- subsidizing the repair industry (e.g., allowing stored parts to be written off against tax and/or exempting parts from an inventory tax, when levied), or subsidizing the consumer (e.g., allowing repairs to qualify as tax deductions);
- taxing new products to make the repair of existing products relatively more desirable; and
- educating the public regarding the possibilities for repair (so that at least it becomes an option which they consider).

(iii) Discourage acquisition/disposal based simply on a desire for change by:

- making new products more expensive (e.g., through taxation) to discourage consumers from replacing their existing products;
- limiting the frequency of introduction of new models; and
- educating consumers (e.g., through counter-advertising) that their desire for change can be wasteful and detrimental to society, as well as being of questionable real benefit to them (since new models of products frequently offer small advantages over existing models, for additional cost).

(iv) Encourage disposal options other than throw away or store by:

- employing consumer education to persuade people of the benefits of having their unused products kept in service by others, rather than being thrown away or stored;
- employing consumer education to persuade people of the benefits of acquiring products used rather than new and to remove any stigma that may be attached thereto;
- facilitating the operation of second-hand markets by providing favorable tax treatment (e.g., exempting all second-hand sales from sales tax);
- making second-hand products relatively more attractive by raising the price of new products (e.g., through taxation); and

- encouraging manufacturers and/or retailers not only to accept trade-ins but also to re-build the products (as necessary) and to offer these re-built products for sale.

Concluding Comments and Recommendations

The study generated some additional findings and thoughts regarding the acquisition and disposal of small electrical appliances, as follows:

Acquisition

(i) While consumers indicated concern about the durability of products in general few sought specific information about the durability of the products they purchased.

(ii) 26 percent of the products were received as gifts and it is possible that appearance may have been more important in these purchase decisions than durability.

Disposal

(i) While complaining in general terms about the durability of products, most consumers were satisfied with products so long as they lasted more than three years.

(ii) Consumers appear to have disposed of products out of a desire for, or as a result of, change about as frequently as they did because of malfunctions. Moreover, some consumers may use the need for repair as an excuse for change (few attempted to repair their products).

(iii) Consumers may "change" products because a new one:

- is technically superior in performing the same function;
- performs a different function; or
- is functionally similar but different in appearance.

Traditionally only the last reason has been labeled wasteful. Policy-makers may wish to consider whether the other two should be discouraged.

Suggestions for further investigation. The study generated a number of specific suggestions for further investigation, in order to:

(i) expand the geographical coverage and sample size of the consumer survey to determine the general validity of the results obtained thus far; and

(ii) explore certain issues identified as potentially important in the study, but on which insufficient data were obtained.

Recommendations for policy-makers. Recognizing that the demands of policy-making usually do not permit the collection of complete information in advance, the study offered the following recommendations as the "best available" at the

present time for increasing the lifetimes of small electrical appliances (assuming that this is the goal):

(i) Policies for increasing the physical durability built in by manufacturers should be pursued for certain products, especially those relatively inexpensive appliances (such as blow hairdryers) which were shown in the survey to frequently malfunction in three years or less. An alternative might be to make repair a less costly and more attractive option, but given the realities (that repair, being labor-intensive, is intrinsically expensive and that consumers often fail to even consider repairing these products), it seems wiser to focus on delaying the time at which products first cease to function.

(ii) In view of the problems of repair just mentioned, consumers should be encouraged to transfer products which have malfunctioned (and would otherwise have been thrown away or stored) to an organization (such as Goodwill Industries) that specializes in repair or to a manufacturer that operates a re-building program.

(iii) Recognizing that many consumers stop using their products even though they are still functioning, consideration should also be given to measures that might encourage longer use. Policies would have to be aimed both at consumers, who seem to have a desire for frequent change, and at manufacturers, who undoubtedly (and understandably, given their goals in a competitive situation) foster this desire.

(iv) To the extent that policy-makers might not be willing or able to discourage change per se, they should direct their efforts at ensuring that products which are no longer used by their original owners are passed on (through informal and formal channels) for subsequent use by new owners.

PREFACE

In January, 1976, the Division of Advanced Productivity of the Research Applications Directorate, National Science Foundation, issued a Program Solicitation entitled "Decision-Related Research in the Field of Urban Technology". Under the service category of Solid Waste Management, it was stated that the Foundation was giving priority to the topic of Waste Reduction Methods, including methods for "increasing the effective life of products by increasing durability or reuse or by decreasing stylistic obsolescence". The study reported herein was proposed, funded, and carried out pursuant to this Solicitation.

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RESEARCH TEAM

School of Architecture and Urban Planning, UCLA		
W. David Conn	Principal Investigator	Assistant Professor of Environmental Planning
J. Eugene Grigsby, III	Faculty Associate	Associate Professor of Social Planning
Carol Inge[1]	Research Assistant	MA student, Urban Planning Program
Biswapriya Sanyal[2]	Research Assistant	PhD student, Urban Planning Program
Elaine C. Warren[3]	Research Assistant	MA student, Urban Planning Program
Thomas H. Hale[4]	Research Assistant	MA student, Urban Planning Program
Richard A. Kentro[4]	Research Assistant	MA student, Urban Planning Program
Catherine A. Kroger[5]	Administrative Analyst	
Laurel C. Kelly[6]	Administrative Analyst	
Graduate School of Management, UCLA		
Richard J. Lutz	Faculty Associate	Associate Professor of Marketing
Marian C. Burke	Research Assistant	PhD student, Marketing Program
Non-University		
Edward J. Wray	Industrial Consultant	(Retired) Manager of Product Safety and Standards, Housewares Division, General Electric Company

The consumer survey was conducted under contract to UCLA by The Planning Group, Inc., Los Angeles, California.

[1] Until August, 1977.

[2] From February, 1977.

[3] From October, 1977.

[4] February-June, 1977.

[5] Until September, 1977.

[6] From October, 1977.

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Applied Science and Research Applications
National Science Foundation

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* Membership of the Advisory Committee does not necessarily imply endorsement of the findings of the report.

SECTION 1
INTRODUCTION

1.1 Problem Definition

Concern over problems of resource depletion and environmental damage, as well as over the ever-increasing costs of disposing of solid wastes, has led to a search for new approaches to managing these wastes. One possibility under consideration is that of extending the lifetimes of durable products, in the hope of slowing both the generation of discards and the demand for replacements. Although it has been shown that the manufacture, use, and disposal of more durable products could, under some circumstances, entail a higher rather than lower intensity of materials and energy use, nevertheless, the extension of product lifetimes seems likely in many cases to offer resource and environmental benefits.

Assuming that policy-makers, for this or any other reason, might wish to extend the lifetimes of durable products (and this study has not addressed the value-laden question of how long an "optimal" lifetime would be), it is important for them to understand the key factors that determine these lifetimes. In the absence of this information, some legislators have already begun to press for government action to influence product lifetimes. For example, proposals have been made for the introduction of product standards (governing durability and other performance characteristics), for the labeling of products as to their expected lifetimes, and for minimum warranty requirements.

It appears that the intent behind these proposed measures is to encourage the manufacture of physically more durable products, this encouragement coming either from direct regulation or from indirect market pressure (assuming that better-informed consumers would tend to purchase longer-lived products). However, it is by no means certain that the physical durability "built in" by a manufacturer is necessarily the primary or even a major determinant of a product's lifetime in use. The latter is likely to be influenced by a wide variety of factors, some controlled by manufacturers but others controlled by retailers, consumers, repairers, second-hand dealers, etc. Thus measures intended solely to influence physical durability could prove ineffective at lengthening product lifetimes. Before such measures are taken, more knowledge on the relative importance of different factors affecting product lifetimes is needed, and it was the recognition of this need that led to the study reported herein.

1.2 Literature Relating to Product Lifetime

A large number of items relating directly or indirectly to the subject of product lifetime are scattered widely throughout the literature, under many different headings. As far as is known, there currently exists no comprehensive bibliography listing all of these items, although there are partial bibliographies that cover particular aspects, such as the economics of durability (Butlin, 1976; Smith and Conn, 1976), the impacts of wear and corrosion technologies (KASC Information Services, 1976), etc.

A selection of literature items considered relevant to the study is briefly reviewed below, under the following headings:

(i) physical characteristics and lifetimes of durable products;

(ii) behavior of manufacturers in supplying durable products;

(iii) behavior of consumers in acquiring and disposing of durable products;

(iv) policy options for influencing the lifetimes of durable products.

1.2.1 Physical characteristics and lifetimes of durable products

Literature items that fall under this heading include:

- an extensive set of contributions to the field of engineering that relate to physical durability and product design; these encompass such topics as wear, corrosion, fatigue, etc. (e.g., Devine, 1976; Shives and Willard, 1978);
- contributions that consider not only the ways in which the physical durabilities of certain products might be increased, but also the likely costs (e.g., the papers on automobile durability by Hundy, 1976, and by Schaeffer, 1974 -- the latter reporting on a project by the German company Porsche to double a car's life expectancy);
- a growing set of contributions relating to the concept of life cycle costing, the application of which requires the determination of a product's expected lifetime (e.g., M.I.T. Center for Policy Alternatives, 1974; Stiefel, Kim, and Hung, 1976; Stiefel and Beine, 1977); included in the 1976 report by Stiefel et al. is a review of the state-of-the-art of durability testing for consumer durables, which observes that very few "life" test methods are agreed upon industry-wide -- although attempts are currently being made to develop and obtain agreement upon standardized procedures (e.g., Yee, 1977);

- contributions relating to the empirical measurement of in-use lifetimes (as determined by physical durability and/or other factors); for example, Teknekron (1973) has surveyed possible sources for obtaining lifetime data; Chapman (1975) and Smith (undated) have explored procedures for empirical measurement; Pennock and Jaeger (1964) and Ruffin and Tippett (1975, 1977) have estimated life expectancy for certain products based on the actuarial analysis of survey results; White (1971), Frain (1970), Hundy (1976), and Parks (1976) have presented data on automobile lifetimes;
- contributions relating to the physical resources involved in the production, use, and disposal of consumer durable products, and the likely impacts on materials and energy flows of an increase in their lifetimes (e.g., Randers, 1971; Smith, 1973; Pearce, 1974; U.S. Environmental Protection Agency, 1975; Flanagan and Lund, 1976; Conn, 1977; Stevenson and Kellogg, Ltd., 1977).

1.2.2 Behavior of manufacturers in supplying durable products

Literature items that fall under this heading include:

- contributions to the field of theoretical economics that discuss the nature of durable goods and develop abstract models (containing restrictive and generally unrealistic assumptions) to explain the supply of this category of goods, with major emphasis given to the question of whether a monopolistic or a competitive industry is likely to produce the more durable products (e.g., Coase, 1972; Douglas and Goldman, 1969; Kamien and Schwartz, 1974; Kleinman and Ophir, 1966; Levhari and Srinivasan, 1969; Martin, 1962; Parks, 1974; Ramm, 1974; Schmalensee, 1970; Sieper and Swan, 1973; Su, 1975; Swan, 1970 a/b, 1971);
- contributions to the field of business management (especially marketing) discussing the possible existence and desirability of "planned obsolescence", defined as "a purposeful program of vendors to shorten the time span or number of performances over which a product (or service or even a way of life) continues to satisfy customers -- thus presumably encouraging an early purchase for replacement" (Tallman, 1959; see also Grathwohl, 1975; Jackson, 1976); it is generally concluded that some forms of planned obsolescence probably do exist (a view supported by a survey of 10,000 business executives, reported by Stewart, 1959) but

that the practice is not necessarily advantageous for business, nor is it necessarily disadvantageous for consumers or society as a whole;

- contributions documenting the existence of planned obsolescence in specific industries, such as those manufacturing automobiles (e.g., White, 1971), tires (e.g., Westerman, 1974), and lightbulbs (e.g., Avinger, 1968; Prais, 1974);
- contributions discussing the responsibilities of manufacturers in general with respect to social and environmental concerns, including concerns about resource conservation, litter, and solid waste disposal (e.g., Murphy and Enis, 1974; Varble, 1972; Webb and Darling, 1973).

1.2.3 Behavior of consumers in acquiring and disposing of durable products

Literature items that fall under this heading include:

- contributions to the field of theoretical economics that examine the demand for durable goods (e.g., Avinger, 1968; Diewart, 1974; Kleinman and Ophir, 1966; Miller, 1961; Su, 1975);
- contributions containing empirical data on the demand for certain durable goods, including estimates of demand elasticities (e.g., Harberger, 1960; Houthakker, 1970; Ernst and Ernst, 1975);
- contributions relating to the disclosure of information on products to consumers (regarding such product characteristics as price, composition, performance, etc.) and consumers' use of this information when making purchases (e.g., Wilkie, 1974; Day, 1975, 1976);
- contributions that focus on the socially conscious or ecologically concerned consumer, including discussions that refer to "socially responsible" ways of product disposition (e.g., Anderson and Cunningham, 1972; Brooker, 1976; Kassarjian, 1971; Kinnear and Taylor, 1973; Kinnear, Taylor, and Ahmed, 1974; McGuinness, Jones, and Cole, 1977; Webster, 1975);
- a small number of contributions that contain empirical information on particular disposition decisions for durable products, typically obtained from surveys of consumers' reasons for making replacement purchases (e.g., Day and Brandt, 1973; Pickering, 1975), but in one case obtained from a study aimed specifically at examining disposition behavior (Jacoby, Berning, and Dietvorst, 1977);* these last authors developed a three-part taxonomy of possible disposal options (i.e., keep the product, permanently dispose of it, or temporarily dispose of it) which they found useful in categorizing

*This study, although conducted earlier, was published after work had begun on the study reported herein.

the behavior revealed in an exploratory survey concerning the disposition of several consumer products,* and they suggested important directions for future research (including the gathering of additional descriptive information, a search for explanations of why certain patterns exist, and efforts to predict and change disposition behavior);

- contributions that report consumers' attitudes and concerns in general about the practices of businesses, government, etc., in relation to durable products (e.g., Barksdale and Darden, 1972; Harris, 1977);
- a very small number of contributions relating to consumers' acquisition and disposal of used products, through both formal and informal channels (e.g., Roussos, 1970; Roussos and Konopa, 1977).

1.2.4 Policy options for influencing the lifetimes of durable products

Literature items that fall under this heading include:

- contributions that provide a broad review of available policy options (e.g., Teknekron, 1973; Lund and Denney, 1977);
- contributions focusing specifically on policies of the U.S. Federal Trade Commission, some of which might be applicable in the area of product lifetimes (e.g., Thain, 1973; Day, 1975).

1.3 Research Objectives

The overall objectives of the research reported herein were to gain a better understanding of the factors that determine product lifetimes and to identify the kinds of policies that might be most effective in increasing these lifetimes. The research sought information in three areas, regarding:

(i) actions of consumers affecting product lifetimes;

(ii) actions of producers affecting product lifetimes;

(iii) the operation of second-hand markets.

Due to the dearth of prior empirical research in these areas, as revealed in the literature, it was always intended that the study should be exploratory. Rather than necessarily providing definitive answers to the questions raised, its purpose was to develop a methodology for examining these questions, to clarify some of the key issues (as well as to determine which might be less important), and generally to point the way to future studies.

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* The products were: toothbrush, stereo amplifier, record, wrist watch, bicycle, and refrigerator.

1.4 Research Methodology

The research included:

(i) a survey of consumers to obtain information about their acquisition and disposal of a selected set of durable products;

(ii) in-depth interviews with firms engaged in the manufacture and distribution of the same set of products; and

(iii) a limited investigation of second-hand markets, involving interviews with market participants and other interested parties, field observation, and reviews of appropriate written documents.

1.4.1 Choice of products for inclusion in the study

The products on which the research was focused are listed in table 1.1; they comprise fourteen mostly "portable" household electrical appliances.

TABLE 1.1
PRODUCTS COVERED IN THE STUDY

Toasters
Toaster Ovens
Blenders
Coffee Makers
Can Openers
Frypans/Skillets
Irons
Blow Hairdryers
Bonnet Hairdryers
Vacuum Cleaners
Radios
Televisions (black and white)
Electric Toothbrushes
Mixers

This class of products was selected for several reasons, namely:

- Although each individual product may not currently be a major contributor to problems of solid waste disposal, resource depletion, and environmental impact, the vast number of such products taken together may nevertheless create significant problems over time.
- Most of the products are relatively inexpensive to purchase but can be costly to repair, so that consumers may be quick to discard them when they break down. When goods are classified on a spectrum from "non-durable" to "durable", it may be that these products, in the consumers' perception, are moving toward the "non-durable" end of the spectrum. If so, they symbolize a trend that appears to be contrary to the notion of waste reduction.

- An obvious alternative class of products that might have been examined would have been major household appliances such as refrigerators, washing machines, etc. However, some research on these products had already been done (e.g., at M.I.T.'s Center for Policy Alternatives) and it was felt that this study, in examining a hitherto unexplored area, might thus be complimentary to the other research.

Given the choice of product class to be examined, an initial list of specific products was developed, based on the following criteria:

- that a range of product types would be included, such as those thought to be characterized by rapid technical innovation, those thought to undergo rapid stylistic change (some being apparent "fad" items), and those thought to remain essentially unchanged from year to year;
- that different models of each specific product selected would be similar enough to allow for comparisons (thus, for example, stereo equipment was excluded due to the wide variations in the kinds of components available);
- that there would be a reasonable likelihood of identifying a significant number of households in the survey population who had disposed of one or more of the selected products within the space of a year; and
- that products would be included which were thought likely to be exchanged in second-hand markets.

It was originally intended that this initial list would be narrowed down early in the study (following the focus groups and pre-testing of the screening instrument for the consumer survey*) so that just a few "representative" products could be examined in depth; with a smaller number of products, the sample size for each would be larger and the product-specific results would therefore have greater statistical significance. However, the results of the screening pre-test revealed that the frequencies with which individual products had been disposed of were too low to narrow the list and still acquire a sufficiently large sample overall (within the time and resource constraints of the project) to support quantitative analysis. Thus all of the products included in the initial list were retained for examination in the consumer survey and throughout most of the rest of the study, although televisions

*See section 2.2.1.

and radios were given less attention than the other products (for example, they were not covered in the interviews with manufacturers).*

1.4.2 Choice of study location

The location for the study was selected on the basis of the following criteria:

- that it should permit a sampling of people displaying a mix of demographic and socioeconomic characteristics (e.g., age, ethnicity, education level, occupation, income, etc.) representative of those found in major communities throughout the United States;
- that it should be familiar and easily accessible to the research team.

The City of Santa Monica, California, was the location chosen. Santa Monica is part of the Los Angeles SMSA; its 1975 population was 92, 115, and it occupies an area of 8.3 square miles adjacent to the Pacific Ocean, due west of downtown Los Angeles. It happens that socioeconomic status (SES) groups are easily identified in Santa Monica since these groups range roughly in three geographical belts from north to south. It also happens that at the time of the study, the city was reviewing its options in solid waste management (paying particular attention to the possibility of introducing household separation and recycling of valuable materials) and it proved possible to arrange for mutual cooperation in the conduct of the consumer survey.**

As mentioned above, the study was intended to be exploratory, and so the potential problem of regional bias was not considered serious; however, it does demand caution in the interpretation of the results.

1.5 Outline of the Remainder of the Report

The methodology and findings of the consumer survey are presented in section 2, with additional supporting material (including a copy of the questionnaire and tabulations of the responses) supplied in appendix B. A summary of the information and sentiments expressed in common by many or most of the manufacturers interviewed, with some company-specific responses included as illustrations (but with no identification of individual companies), is

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* This was because it became apparent that these products, especially the televisions, fall into a different class from most of the other products; for example, they are largely manufactured by a different group of companies.

** Respondents were asked a few questions about the refuse service in Santa Monica (see appendix B, questions 42 through 44).

given in section 3. Section 4 provides a report on the investigation of second-hand markets. In section 5 there is a review and discussion of selected policy approaches for increasing product lifetimes, based on information gathered in the three parts of the study, as well as additional information obtained from the literature, from contacts with government officials, etc. Finally, some concluding comments and the recommendations of the study are presented in section 6.

SECTION 2
CONSUMER SURVEY

2.1 Introduction

This section describes and analyzes the results of the consumer survey conducted by the research team with the aid of consultants. The purpose of the survey was to gather information on how the actions of consumers affect the lifetimes of durable products. Specifically, the survey aimed to identify how consumers acquire, maintain, and dispose of small electrical household appliances.

The contents of this section include:

(i) a description of the survey methodology;

(ii) general findings from the survey;

(iii) a discussion of the relationship between the type of product and the disposal option chosen;

(iv) a discussion of the inter-relationships among price, functional state of the product when discarded, years of product use, and disposal option chosen;

(v) suggestions as to why many products are not repaired; and

(vi) suggestions as to how consumer attitudes and behavior affect product durability.

2.2 Methodology

2.2.1 Development and content of the survey instruments

The survey instruments were developed by the research team with the aid of professional survey research consultants. Two instruments were utilized:

(i) a telephone pre-screener, used in the initial telephone contact; and

(ii) a full-scale questionnaire, used in the home interviews.

As an aid in developing these instruments, focus group discussions were held to provide consumer input. Market research consultants conducted three separate sessions, each involving nine randomly selected consumers. A professional moderator led each group through an informal discussion of the products to be studied. The research team observed and recorded these sessions, which proved valuable in pinpointing topics for investigation, in formulating the wording of the questions, and in enabling the team to anticipate the kinds of responses that would be given in the main survey.

The telephone pre-screener provided the information needed to obtain a respondent's informed consent to be interviewed,* and asked whether the respondent had repaired or disposed of one or more of the fourteen products under investigation in the preceding twelve months. "Disposing" in this context did not necessarily mean "throwing away" but rather referred to the termination of a product's useful life within the household. Thus, for example, an item that was still in the household but had been stored by the respondent with no definite intention to re-use in the future,** qualified ashaving undergone disposal. Other actions qualifying as disposed are listed in table 2.2.1. Respondents who had disposed of one or more of the products were considered "eligible" for the purpose of the survey and were asked if they would consent to a home interview.*** A copy of the pre-screener and a list of complete definitions of each disposal option are included in appendix A.

TABLE 2.2.1
DISPOSAL OPTIONS CONSIDERED IN THE STUDY

Store (with no definite intention of re-use)
Throw away
Give to friend or relative
Donate to charity
Sell
Trade-in

The questionnaire used in the home interview had two main parts. The first part sought information on consumer behavior regarding the purchase, maintenance, and disposal of one particular good (from the list of fourteen) discarded by the respondent within the past year. This part of the questionnaire was designed to be administered by professional interviewers. The second part of the questionnaire sought information on consumer attitudes regarding the purchase, maintenance, and disposal of all small electrical products. For each respondent there was provided a list of statements about small electrical products and how people use them. The respondents were asked

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*As approved by the UCLA Human Subject Protection Committee.

**Storage for seasonal or occasional use was not considered to be a disposal option.

***Eligibility did not extend to those who had simply repaired their products. Information about repair was collected at this stage for use in its own right.

to indicate for each statement whether they strongly agreed, agreed, disagreed, strongly disagreed, or had no opinion. The questionnaire also sought data on the socioeconomic characteristics of the sample: the age, sex, family income, family size, ethnicity, and educational level of each respondent.* Appendix C contains a complete copy of the questionnaire, together with the response frequencies for each question.

2.2.2 Pre-testing of the survey instruments

Each of the survey instruments was pre-tested. The telephone screener pre-test had two main objectives:

(i) to determine whether the initial list of fourteen products could be narrowed to three or four representative products for study in greater depth; and

(ii) to test the clarity of the questions so that any possible ambiguities could be removed.

Telephone interviews were conducted with randomly selected persons from three carefully chosen census tracts in the Los Angeles area, representing high, moderate, and low socioeconomic status areas. The researchers succeeded in contacting a total of 107 persons (out of 223 attempts).

The principal result of the screener pre-test was the decision to include all fourteen products in the final survey. As mentioned in section 1., above, the frequencies with which individual products had been disposed of were too low to narrow the list and still acquire a sufficiently large sample overall to support quantitative analysis.

The household survey pre-test was a preliminary run of the actual survey and aimed to eliminate any problems in the interview procedure, the questionnaire format, and the telephone screener that were not previously evident. The researchers contacted those persons from the screener pre-test who had indicated they were eligible and willing to be interviewed at home. Each interview was found to last about thirty minutes. The team conducted twenty-five pre-test interviews in all. As a result of this pre-test, the interviewers revised the initial telephone contact questions since some persons thought themselves eligible under the "stored" option although they were still using the products. Other minor revisions were made in the questionnaire instrument.

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*In addition, the questionnaire included three questions relating to municipal refuse collection in the City of Santa Monica. These were included at the city's request, in return for which the city made available a letter (on city letterhead) informing residents about the existence and purpose of the survey.

The main survey was then conducted using these revised instruments, but following essentially the same procedures as used in the pre-tests.

2.2.3 Sample composition

The procedure used in selecting the survey sample was designed to obtain approximately an equal number of respondents each from high, medium, and low socioeconomic status (SES) groups. Respondents were selected from six census tracts, two for each SES group. The census tracts and respondents were chosen using common probability sampling methods which involved:

(i) identifying all tracts falling within the city boundaries;

(ii) ordering the tracts on an indirect indicator of SES -- median education at tract level;*

(iii) specifying the number of tracts to be selected -- two for each SES group (to increase the chances of achieving a representative total sample); and

(iv) randomly selecting blocks of addresses within tracts, and employing the Haines Directory to obtain the telephone numbers of residential dwelling within the blocks.

Of the 3,291 dwellings to which calls were placed, contact was made with 2,682, and a total of 1,893 persons answered the screener questions. Of those who answered, 629 (i.3., 33 percent) had disposed of one or more of the products under study within the past year, thereby making them eligible for household interviews. A total of 506 persons agreed to be interviewed, and the research team was ultimately able to successfully complete 311 interviews altogether.**

Although an effort was made to obtain a representative sample of the population, the small size and possible regional bias of the survey mean that the results may be generalized with certainty only to the population in Santa Monica. The demographic characteristics of the sample are shown in table 2.2.2. It is apparent that, although efforts were made in the initial screening to contact an equal number of people from each SES group, most of those who proved eligible and were interviewed were Caucasian, well-educated, and fairly affluent. This could mean that people with these characteristics are

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* Median education is a commonly used indicator and, given the time and budget constraints, the best available to insure a selection of households displaying the SES range of the city.

** See appendix B for additional data on the telephone screening.

more likely to own and be in a position to dispose of the items studied (although other explanations for the skewed sample could also be offered -- for example, less well-educated people may have been unwilling or unable to answer the screening questions).

TABLE 2.2.2
DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Median income	$15,440
Median age (years)	39.5
Median education (years)	14.36
Median household size	2.28
Percent in labor force	47
Percent unemployed	10
Ethnic background (percent)	
Caucasian	89
Black	4
Mexican-American	2
Asian	2
Other	3
Occupation (percent)	
Professional/technical	40
Clerical	28
Managers/officials	11
Service workers	10
Marital status	
Married	60
Never married	20
Widowed/separated/divorced	19
Sex (percent)	
Male	28
Female	72
Rent home (percent)	52
Own home (percent)	47

2.3 General Findings

2.3.1 Introduction

Some general results from the consumer survey are presented here. Subsequent sections discuss these findings in greater detail.

Owing to the lack of prior research on consumer disposal decisions, the survey was exploratory in nature, although the team had in mind certain

tentative hypotheses, such as:

(i) that some problems are discarded before the end of their useful lives (i.e., product lifetimes are not necessarily determined by physical durability);

(ii) that consumers generally know (and possibly care) little about a product's physical durability at the time of acquisition; and

(iii) that there may be a price threshold, below which products are discarded without much hesitation when they break down (however minor the fault), and above which the possibility of repair is more carefully considered.

It was hoped that by including a broad range of questions in the survey, light would be shed not only on the validity of these and other preconceived hypotheses, but also that additional factors influencing consumers' acquisition, use, and disposal decisions would emerge.

A problem which was anticipated by the research team was that, despite careful wording of the questionnaire, respondents may have tended to give "socially desirable" answers to some of the attitudinal questions. Indeed it was found that many of the responses to these questions appeared to conflict with responses to questions that asked about specific past behavior. Special care must therefore be taken in interpreting the attitudinal data.

2.3.2 Choice of disposal options and reasons for disposal

Table 2.3.1 lists the options that fell within the definition of "disposal" for the purpose of the study and the frequency distribution of the disposal options recorded in the completed interviews. "Stored" and "thrown away" were the two options most frequently chosen. It may be noted that these options are thought more likely to signify the end of a product's useful lifetime than the other four options, although stored items might of course subsequently be re-used (and the lifetimes of products given away, donated, sold, or traded-in might not be extended by their new owners).

TABLE 2.3.1
DISPOSAL OPTION FREQUENCY DISTRIBUTION

Option	Percent
Stored	41
Thrown Away	21
Given Away	18
Donated	11
Sold	7
Traded-in	2

Total number of respondents = 311

Respondents were asked to describe the circumstances which led to their disposal decisions. Many of the answers to this open-ended question were similar and could be grouped together (see table 2.3.2). The most important reasons given for disposing of products were:

(i) the product was inoperative (40 percent of the respondents gave this as the most important reason*);

(ii) a new product was preferred (26 percent); and

(iii) the respondent had no use for the product (25 percent).

TABLE 2.3.2
CIRCUMSTANCES WHICH LED TO DISPOSAL DECISION

Reason	Percent giving reason
A. Product inoperative:	40
not working -- no attempt to repair	27
repair cost too high	9
misused and consequently inoperative	3
can't get repair parts	1
B. New product preferred:	26
had or bought a replacement	10
obtained technically improved model	8
given a replacement	4
very old -- not working as well as new ones	4
C. No use for product:	25
lifestyle change and no longer need	8
don't like the product and/or way it functions	8
never any need for product	6
inconvenient to use (no space in kitchen, etc.)	3
D. Other:	9
friend or relative needed	5
moving or will move soon	3
unclear	1

Total number of respondents = 303

Table 2.3.3 compares the circumstance which led to disposal with the disposal option chosen by each respondent. Many people who had "no use for" their products chose to store them (see table 2.3.3, I). Those who "preferred

* Although this information was not used in the main survey, the telephone screening also produced data on the frequency of repair of small electrical appliances within the previous twelve months. Out of 1,893 households questioned, 204 products from the list of fourteen products had been repaired in the past twelve months.

a new product" were most likely to choose one of the "other" four disposal options (i.e., donate, sell, give away, trade-in). Those whose products were inoperative were least likely to choose one of these other options. Most respondents who threw items away (83 percent) did so because the product had become inoperative (see table 2.3.3, II). Almost all of the others who threw items away (14 percent) did so because they had replaced the old product with a new one.

TABLE 2.3.3
CIRCUMSTANCES WHICH LED TO DISPOSAL DECISION AND CHOICE OF DISPOSAL OPTION*

I. Disposal option by circumstance which led to disposal

Reason for disposal of product	Disposal option (percent) Stored	Thrown Away	Other	n
Preferred new product	39	12	49	79
Product inoperative	39	42	19	127
No use for product	53	3	44	81
Other	17	0	83	8

II. Circumstance which led to disposal by disposal option

Disposal option	Reason for disposal (percent) Preferred new product	Product broken	No use for product	Other	n
Stored	24	39	34	3	124
Thrown away	14	83	3	0	64
Other	33	20	30	17	107

The data support the supposition that people usually throw products away because they no longer function. It is interesting that not all of those whose products were inoperative at the time of disposal (54 percent of the sample**) gave this as their most important reason for disposing, which suggests that the possibility of having their products repaired might not even have been considered. The data also imply that people disposing of products that they no longer use (or never used) typically choose to store them. It may be that these products are in particularly good condition (due

* This table reads across, each row adding up to 100 percent.

** See section 2.3.6.

to little or no prior use) and so their owners are reluctant to part with them.

Respondents were asked to give the reasons for their disposal option choices. The most frequent responses given are shown in table 2.3.4. Some of the respondents (35 percent) considered more than one disposal option. Table 2.3.5 shows the most frequent responses given for not choosing a particular disposal option and the percent of people who gave that reason.

TABLE 2.3.4
REASONS FOR CHOICE OF DISPOSAL OPTION

	Percent	Total n responding for each disposal option
Stored		128
Possible future use	35	
Couldn't decide what to do, nice	23	
Will repair in future	15	
Thrown away		65
Damaged beyond repair	29	
Not worth repairing	29	
Easiest option available	11	
Given away		56
Friend, relative needed one	39	
Still works -- not used now	30	
Nice to do	16	
Sold		34
Need the money	24	
Still useful -- saleable	24	
Garage sales fun	10	
Donated		22
So others can use	35	
Support volunteer organizations	30	
Too much trouble to repair	18	
Traded-in		6
To get a price cut	43	
Still worth something	29	
Wanted new one	29	

TABLE 2.3.5
PRIMARY REASONS FOR NOT CHOOSING A DISPOSAL OPTION

Option	Reason	Percent of total for option	Total n responding for that option
Stored	Others need the product	39	18
Thrown away	The product was still worth something	24	34
Given away	No one wanted it	49	33
Sold	It's not worth much or no one would buy it	36	28
Donated	It is too much trouble	16	51
Traded-in	Didn't want a new one	25	8

2.3.3 Time of disposal

Respondents indicated when, in the preceding year, they had disposed of their product. The data show that more than half of the products (61 percent) had been disposed of in the six months preceding the interviews. This information suggests the following possibilities:

(i) People who had disposed of a product zero to six months before the survey may have been more likely to remember having done so than people who had disposed of a product seven to twelve months before the survey.

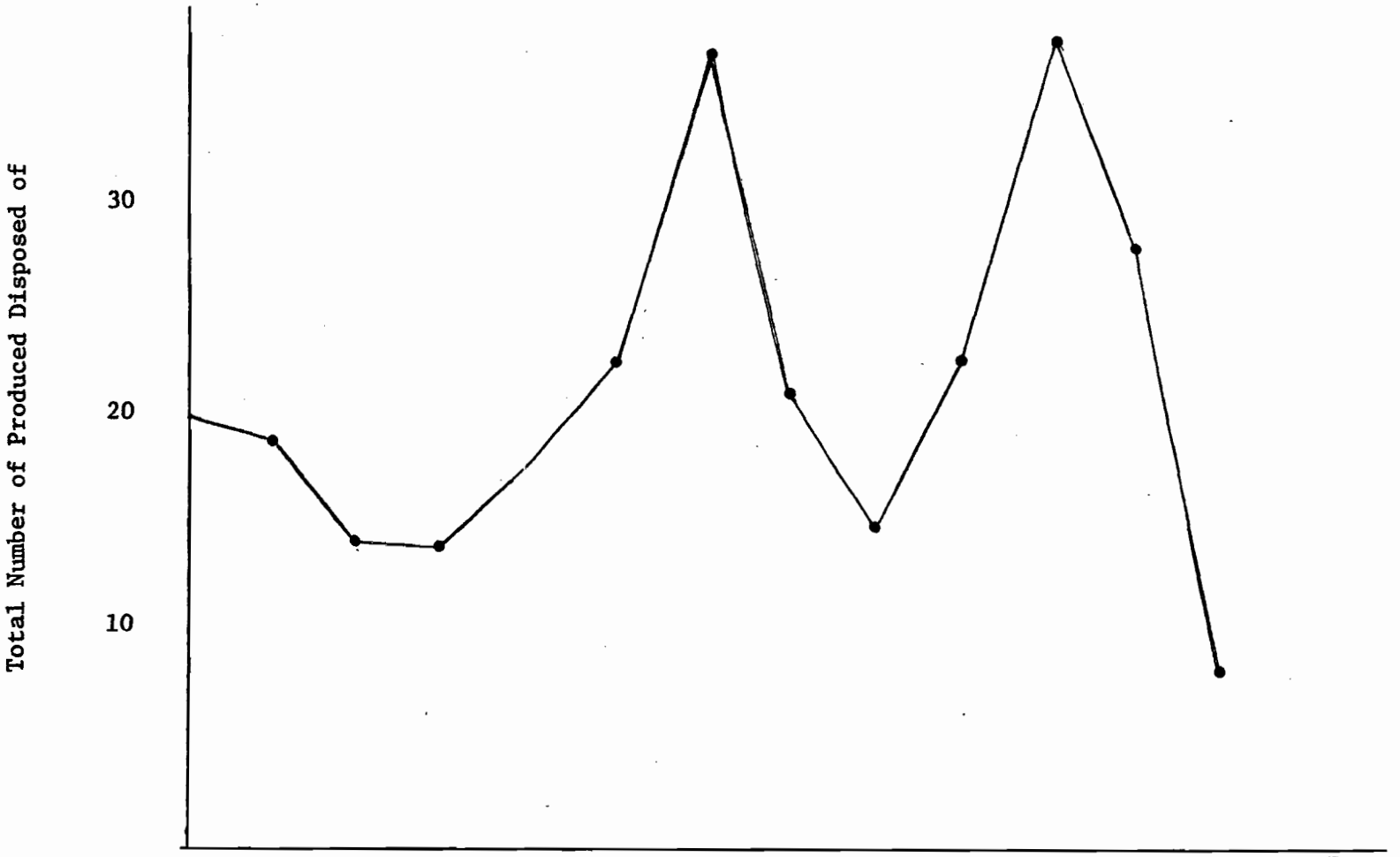
(ii) There may have been no difference in the respondents' ability to recall disposing of a product at any time within the preceding year. Instead, the reporting of uneven disposal of products over the year may reflect seasonal variations in disposal patterns. Figure 2.3.1 indicates the number of products disposed of in each of the twelve months. Respondents had disposed of products most frequently in January and May, perhaps because they had received new electrical products as gifts (on Christmas and Mother's Day).

(iii) Of those disposal activities that were actually reported in the survey (regardless of how the observed variations might be explained), it seems likely that the circumstances surrounding the more recent ones will have been recalled most accurately. The fact that the majority of the activities took place within the preceding six months tends to lessen any concern about having to rely on respondents' memories for determining factors influencing their disposal decisions.

2.3.4 Acquisition patterns

Table 2.3.6 indicates the patterns of acquisition of the products disposed

FIGURE 2.3.1
TOTAL NUMBER OF PRODUCTS DISPOSED OF EACH MONTH



Month of Disposal	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Date of Survey
Months Between Disposal and Survey	12	11	10	9	8	7	6	5	4	3	2	1	<1 Time	

of and their replacements, if any. It should be noted that for the purpose of the survey, products were considered to be "replacements" for those that had been disposed of only if they fell into the same product category; thus, for example, a replacement for a toaster had to be another toaster (in order to qualify) and not a toaster oven, as the latter fell into a different category (even though it can perform a similar function).

TABLE 2.3.6
SOURCES OF ACQUISITION

Products	Percent acquired by: Purchase	Gift	Other	n
Those disposed of	56	40	4	311
Replacements	70	26	4	159

It was hypothesized above that people may have disposed of products most frequently in January and May because they had received new products as gifts. However, table 2.3.6 indicates that only 159 respondents (51 percent) had obtained replacement products for those disposed of, and of these respondents, almost 70 percent had replaced the products themselves by direct purchase. Thus the data do not appear to support the hypothesis.

Several reasons may be suggested for why people had not obtained replacement products:

(i) They may have acquired a different product that performed the same function as the product disposed of (e.g., a toaster oven instead of a toaster, as mentioned above; or a blow hairdryer instead of a bonnet hairdryer).

(ii) The disposed product may originally have been a gift which was not appropriate for the respondent's use.*

(iii) The disposed product may have been a fad item which had become outmoded.

(iv) The respondent's habits or lifestyle may have changed and the product may no longer have been needed.

The survey showed that respondents had acquired products new rather than used 90 percent of the time. Most of those acquired used had come through

* See table 2.3.2

informal channels (e.g., from a friend or relative) instead of through a second-hand market such as a garage sale or thrift shop.

2.3.5 Product price and quality

Most of the products surveyed were (according to the respondents*) inexpensive items that had cost less than $25.00 The median and mean prices for all products were $20.81 and $42.88 respectively.** Table 2.3.7 shows the percent of products in five different price groups.

TABLE 2.3.7
PRODUCTS IN VARIOUS PRICE GROUPS

Product price	Percent of total
0 - $ 15	27
$16 - $ 30	46
$31 - $ 45	5
$46 - $100	14
≥ $101	8

Total number of products = 185

According to the respondents, 57 percent of the products had cost about the same amount as other brands or models on the market. Similarly, 50 percent of the products were thought to have been of a quality equal to that of other makes and models available at the time of purchase. Figure 2.3.2 shows how respondents ranked their products as to cost and quality compared to other products in the market-place. Both factors form a fairly normal distribution, with most respondents ranking their products about average and a few ranking

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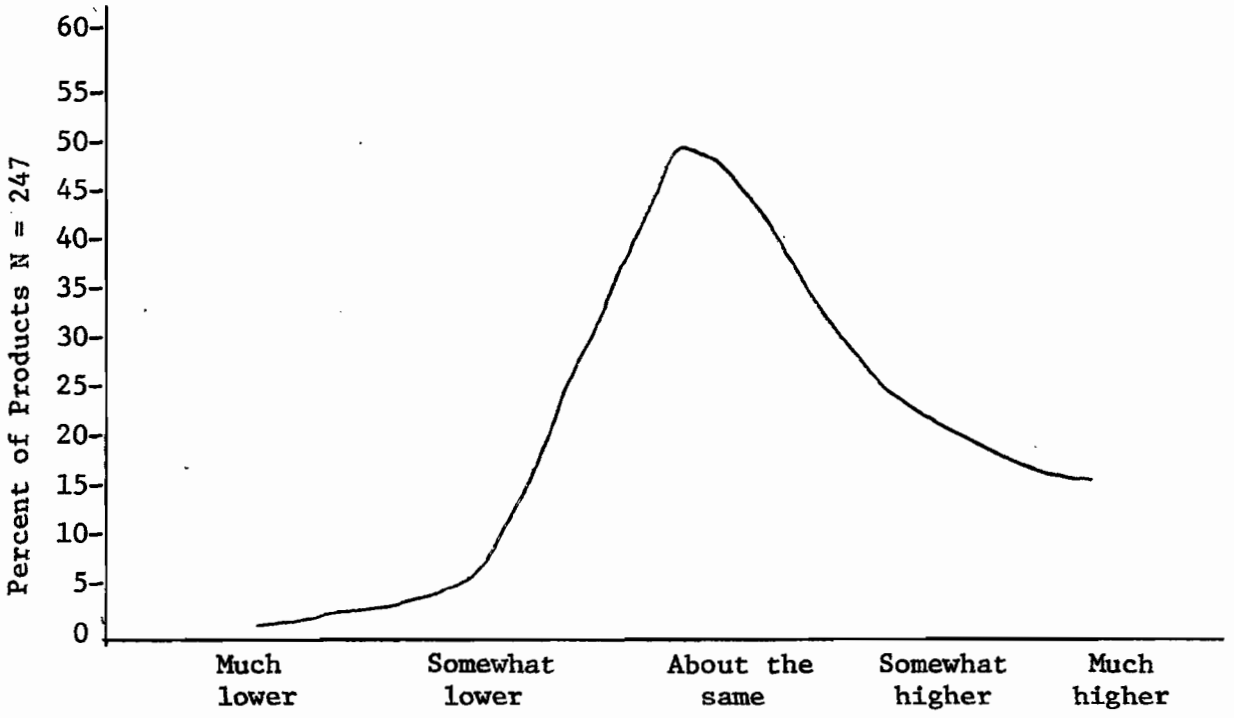
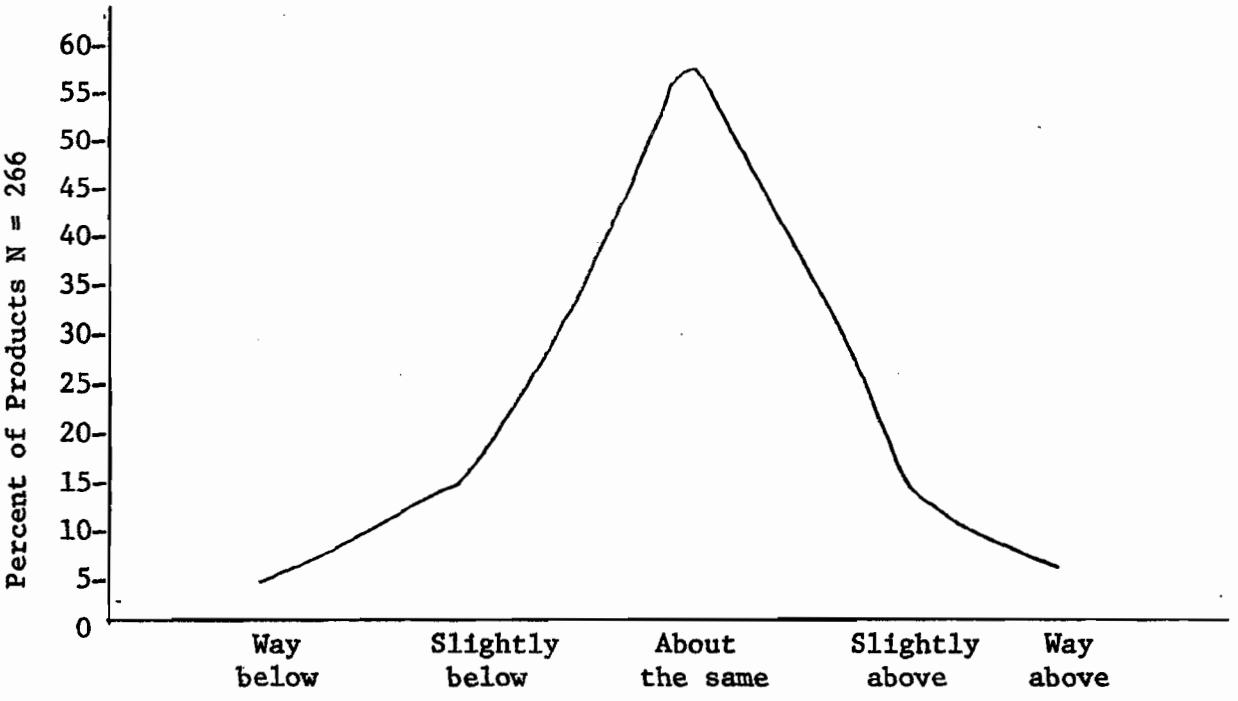
* The prices quoted by the respondents must be treated with caution (as must other information relating to the initial acquisition of the products now disposed of), since the respondents generally had to think back over several years. Their memories of prices, in particular, may have been distorted owing to the rapidly changing value of money in recent years.

** The median and mean figures differ significantly since there were a few very expensive items ($250 to $550) and a large number of inexpensive items (under $30).

FIGURE 2.3.2
COMPARISON OF QUALITY OF THE PRODUCT WITH OTHERS



COMPARISON OF THE COST OF THE PRODUCT WITH OTHERS



their products either above or below average. Quality is slightly skewed toward the higher end, perhaps because respondents were somewhat reluctant to admit that they acquired a low quality product.

2.3.6 Product use and repair

The study revealed that 54 percent of the products at the time of disposal needed repair. Only 18 percent of the products had been repaired previously. The high cost of repair was the reason given most frequently (by 25 percent of the respondents) for not repairing a product.

Respondents reported using their products for various lengths of time and with variable frequency. The years of product use ranged between less than one year and 37 years. The frequency of product use per month ranged from less than one time per month to 280 times per month. However, the number of times that a product is used may have little bearing on the length of time (minutes) that it is used; furthermore, these figures obviously depend on the respondents' ability to accurately recall the frequency of use, which is likely to be difficult for many people. The figures must, therefore, be treated with utmost caution.*

Respondents' memories of how long they had expected their products to last (on acquisition) varied from zero to 40 years (note that about 10 percent of the products had been purchased "used"). Table 2.3.8 shows the mean and median values for these three variables. The table shows that overall, the products lasted about the same length of time as the respondents had expected them to last.

2.3.7 Purchase decision criteria

Respondents who had originally purchased their old appliance (as opposed to receiving the product as a gift) were asked to recall the factors most important in their purchase decision. These consumers were asked to indicate, for each of nine factors, whether the factor was extremely important, important,

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* The research team recognized in advance the difficulty of obtaining reliable data on the amount of use given to a product prior to its disposal, but were unable to develop a satisfactory method of measurement. The questionnaire included questions about both frequency and time of use in the hope that respondents might be able to make reasonable estimates of one or the other (if not both). For example, it is perhaps easier to remember the number of times (rather than the length of time) that a toaster is used in a week, while the opposite might be true for an iron.

somewhat important, or not at all important in the purchase decision. Table 2.3.9 shows the frequency of responses.

TABLE 2.3.8
YEARS OF USE, YEARS OF EXPECTED USE,
AND FREQUENCY OF USE

	Years of use	Years of expected use
Mean years	6.59	6.68
Median years	4.67	5.16
Range	0 - 37	0 - 40
Standard deviation	6.33	5.30
n	299	217

	Frequency of use per month
Mean times per month	32.43
Median times per month	18.00
Range	0 - 280
Standard deviation	41.11
n	300

TABLE 2.3.9
FACTORS CONTRIBUTING TO PURCHASE DECISION

	Percent indicating factor:			
Factor	Important & very important	Somewhat important	Not important	n
Appearance	39	29	32	174
Durability	88	4	8	173
Cost	65	25	10	174
Terms of guarantee	49	22	29	172
Instructions	54	16	30	172
Ease of repair	51	17	32	172
Reliability	92	4	4	171
Performance	99	0.5	0.5	173
Manufacturer's reputation	86	7	7	173

Product performance and then reliability, durability, and the manufacturer's reputation were considered the most important factors in the respondent's purchase decision. The least important factors were appearance, terms of the guarantee, ease of repair, and instructions. Cost was a moderately important consideration. One might conclude from this that people want products that function well, function when needed, and have a long lifetime. It would appear that such information is mainly derived from the manufacturer's reputation rather than the terms of the guarantee or the appearance of the product.

Respondents were asked where, if anywhere, they had received information on the product's durability and reliability of performance. Table 2.3.10 lists the sources of information of these two factors and the percent of respondents using each source. As can be seen from this table, almost 30 percent had not obtained this kind of information from any source.

TABLE 2.3.10
SOURCES OF INFORMATION ON PRODUCT DURABILITY AND RELIABILITY

Source of information	Percent using to determine: Durability	Reliability
Consumer reports or other consumer rating	8	7
Advertising	10	10
Personal experience	24	25
The sales clerk	5	5
A friend or relative	13	16
Other source	11	11
Didn't seek information	29	26

Total number of respondents = 175

Table 2.3.9 indicates that the respondents considered operating and maintenance instructions only moderately important in their purchase decision. In addition, few respondents had kept track of and used the instructions accompanying their product. While 75 percent of the products came with operating

and maintenance instructions, the survey revealed that only 42 percent of the respondents had kept track of and followed the operating instructions and only 19 percent had followed a regular schedule of maintenance, if one was recommended.

2.3.8 Summary

The following statements can be drawn from the information presented above:

(i) The disposal of products generally occurred because: 1) products were inoperative, 2) respondents preferred new ones, or 3) respondents had no use for their old products.

(ii) The disposal choices resulted in the end of the useful life of 20 percent of the products, the probable extension of the useful life of 40 percent, and uncertainty as to the continued life of 40 percent.

(iii) Half of the respondents obtained replacements for the products discarded; 70 percent of the replacements were purchased (30 percent were gifts).

(iv) Only 10 percent of the discarded products had been obtained used.

(v) Over 50 percent of the products had cost under $25. The price and quality of products, as indicated by respondents, were mostly comparable to other similar products on the market.

(vi) 54 percent of the products needed repair when discarded.

(vii) Products were used an average of 6.59 years (a median of 4.67 years).

(viii) Factors most important to the respondents' purchase decisions were performance, reliability, and durability. It appears that information on these characteristics was based primarily on the manufacturers' reputations and personal experience.

(ix) Few respondents kept track of the instructions accompanying their products.

2.4 Disposal Options and Product Type

2.4.1 Introduction

This section of the report attempts to provide insight into why respondents chose a particular disposal option by examining the various product types in detail. Unfortunately, the sample sizes for some of the product types are extremely small, so that extra caution must be used in drawing conclusions. Because of this problem, for some parts of the analysis, certain individual products have been grouped together in categories comprising:

(i) kitchen aids, and

(ii) personal care items.

Vacuum cleaners, due to their price range and particular nature of use, have been treated as a separate category, while televisions, radios, and irons have been excluded from this second level of analysis.*

As mentioned in section 2.3.2, above, the disposal options "throw away" and "store" can be distinguished from the other four options on the grounds that the former are more likely to lead to the end of a product's useful lifetime. For much of the analysis, therefore, the options "give away", "donate", "sell", and "trade-in" have been grouped into a single category.

2.4.2 Disposal options selected by product type

Table 2.4.1 shows the relationship between product type and disposal option. The table suggests that the choice of disposal option was indeed determined, at least to some degree, by the type of product disposed of.

TABLE 2.4.1
DISPOSAL OPTION BY PRODUCT TYPE

Appliance	Percent of products: Thrown away	Stored	Other**	n
Toaster	29	26	45	35
Toaster oven	0	36	64	11
Mixer	19	33	48	21
Can opener	30	46	24	33
Coffee maker	32	50	36	16
Blender	17	56	27	23
Skillet	10	40	50	10
Blow dryer	42	42	16	41
Bonnet hairdryer	19	57	23	21
Elec. Toothbrush	20	40	40	5
Vacuum cleaner	0	32	67	29
Iron	32	38	30	16
Television (B & W)	7	35	59	34
Radio	13	62	25	16
All products	21	41	38	311

Significance = .0036***

* This is because they cannot sensibly be grouped in the other categories, while televisions and radios differ too much in price to be grouped together.

** See appendix D for breakdown of "other" category.

*** The significance level, based on the chi-square test of statistical significance, indicates the probability that a given relationship identified

(see footnote continued on next page)

Products most often thrown away were blow dryers (42 percent), irons (32 percent), and coffee makers (32 percent). Products most often stored were radios (62 percent), bonnet hairdryers (57 percent), and blenders (56 percent). Products most often disposed of by selling, donating, giving, or trading-in were vacuum cleaners (67 percent), toaster ovens (64 percent), and televisions (59 percent).

2.4.3 Reasons for throwing products away

Table 2.4.2 lists the reasons given for throwing away blow dryers, irons, and coffee makers. It is clear that (according to the respondents) most of the products had broken down and nearly 40 percent were damaged beyond repair.*

TABLE 2.4.2
REASONS FOR THROWING AWAY BLOW DRYERS, IRONS, AND COFFEE MAKERS

Reasons for throwing away	Percent
Damaged beyond repair	37
Not worth repairing because too costly or product worth little, even if repaired	26
Too old to repair	11
Anything else too much trouble	7.5
No place to store	7.5
Other (didn't know what else to do, repaired before, new model better)	11

Total number of respondents = 27

among a set of variables for a sample of a population truly exists for the population as a whole. If a relationship has a significance level of 0.05, this means that in only five out of 100 cases would random samples drawn from the population an infinite number of times be expected to exhibit the relationship by chance alone, even though the variables are actually unrelated in the larger population. Thus one can be 95 percent "confident" that the variables are indeed related. The choice of an "acceptable" significance level involves personal judgement and depends on the purpose of the analysis. In the present (exploratory) study, given the small sample size, a significance level of 0.05 or better has been considered adequate to indicate a relationship worthy of closer examination.

* The precise criterion by which respondents judged their products to be "damaged beyond repair" was not specified.

Table 2.4.3 indicates that nearly all of the products thrown away needed repair at the time of disposal; exceptions were bonnet hairdryers (34 percent of which were thrown away while in working condition), toasters (10 percent), and can openers (10 percent). However, thrown away products accounted for only 36 percent of the products that were discarded in need of repair.* Thus "needing repair" may be a necessary, though not a sufficient, condition for a product to be thrown away. Other factors that may affect the owner's decision to throw away the particular product are considered later in this section and in section 2.5, Disposal Options and Price.

TABLE 2.4.3
PHYSICAL STATE OF APPLIANCE AT THE TIME OF BEING THROWN AWAY

Product type	Percent of products: Needing repair	Not needing repair	n
Toaster	90	10	10
Toaster oven	0	0	0
Mixer	100	0	4
Can opener	90	10	10
Coffee maker	100	0	5
Blender	100	0	4
Skillet	100	0	1
Blow dryer	100	0	17
Bonnet hairdryer	66	34	3
Elec. Toothbrush	0	0	0
Television (B&W)	100	0	2
Radio	100	0	2
Vaccum cleaner	0	0	0
Iron	100	0	5
All products	95	5	63

Significance = .0117

2.4.4 Reasons for storing products

Table 2.4.4 lists the reasons given for storing radios, bonnet hairdryers, and blenders. Nearly 25 percent of these products were stored in working condition. Table 2.4.5 suggests that this finding holds for most of the other

* Compare tables 2.4.3 and 2.8.2.

product types; that is, a significant number of all the products were stored though they were still functioning.

TABLE 2.4.4
REASONS FOR STORING RADIOS, BONNET HAIRDRYERS, AND BLENDERS

Reasons for storing	Percent
Possible future use -- still works	35
Too nice to throw it away -- couldn't decide what else to do	29
It or some part might come in handy some day	12
May repair in future	6
Didn't want to contribute to waste problem	3
It was a gift so I didn't want to get rid of it	3
Planning a garage sale in future	3
Other reason	9

Total number of respondents = 35

TABLE 2.4.5
PHYSICAL STATE OF APPLIANCE AT THE TIME OF BEING STORED

Product type	Percent of products: Needing repair	Not needing repair	n
Toaster	78	22	9
Toaster oven	25	75	4
Mixer	43	57	7
Can opener	70	30	14
Coffee maker	15	85	8
Blender	40	60	13
Skillet	50	50	4
Blow dryer	70	30	16
Bonnet hairdryer	20	80	12
Elec. Toothbrush	50	50	2
Television (B&W)	80	20	10
Radio	60	40	10
Vacuum cleaner	50	50	10
Iron	75	25	4
All products	53	47	123

Although the survey responses did not provide a full explanation of why many people stopped using their products and stored them in working order, a few suggestions can be made for specific products. Bonnet hairdryers, for example, may have been stored because consumers had switched to blow dryers. Percolator coffee makers may have been put aside in favor of the newer "drip-type" coffee makers. Black and white televisions may have given way to color televisions. The disused products could have been thrown away or disposed of by some other means, but their owners may instead have preferred to put them in storage, as long as they were still working, as a kind of insurance; they could always be brought into service again if and when the new product itself were to break down. As pointed out in table 2.3.3, of the persons who had stored products, 34 percent said they disposed of their products because they had no use for them, and 24 percent said they preferred new ones.

2.4.5 Disposal option and length of previous use

Table 2.4.6 provides data on the number of years each product had been used prior to disposal. For nine of the fourteen product types, more than 25 percent of the products had been used for two years or less prior to their disposal. Of these nine product types, blow dryers, blenders, and skillets demand special attention as 50 to 70 percent of these appliances had been used for only two years or less. Only three product types (coffee makers, bonnet hairdryers, and vacuum cleaners) had been used a median of seven years or more.

TABLE 2.4.6
YEARS OF USE BY PRODUCT TYPE

Appliance	Percent of products used: 0-2 yrs	3-6 yrs	Over 6 years	n	Median number of years used
Toaster	31	32	37	35	4
Toaster oven	27	27	46	11	5
Mixer	14	48	38	21	5
Can opener	36	32	32	31	4
Coffee maker	27	13	60	15	7
Blender	45	42	13	22	3
Skillet	40	20	40	10	5
Blow dryer	70	25	5	40	2
Bonnet hairdryer	15	25	60	20	9
Elec. Toothbrush	33	33	67	3	6
Television (B&W)	24	45	31	29	6
Radio	13	50	32	16	5.5
Vacuum cleaner	9	31	61	32	10
Iron	36	36	28	14	5

Significance : $\leq .001$

The data, however, do not indicate a consistent pattern relating the years that a product had been used to the likelihood of being thrown away. For example, blow dryers were most often thrown away, and had the lowest median years of use. At the same time, coffee makers and irons were frequently thrown away, but had average to above average median years of use. Most bonnet hairdryers were stored rather than thrown away, and had a high median years of use; blenders which were often stored also had a low median years of use.

Product types, when grouped into three categories (kitchen aid, personal care, and vacuum cleaners), appear to shed more light on the relationships among disposal option, product type, and years of use. Table 2.4.7, which compares three product categories to disposal options, shows that vacuum cleaners were most often given away, sold, donated, or traded-in, while personal care and kitchen aid items were most often stored. However, personal care items were thrown away most frequently (32 percent) and disposed of in one of the "other" four ways the least often.

TABLE 2.4.7
DISPOSAL OPTION BY PRODUCT TYPE CATEGORY

Product type category	Disposal option (percent)			
	Thrown away	Stored	Other	n
Kitchen aid	23	41	36	145
Personal care	32	48	20	63
Vacuum cleaner	0	31	69	32

Significance $\leq .001$

This information is useful when compared with table 2.4.8 which shows the three product categories and years of product use. Personal care items were disposed of most quickly -- 51 percent were used less then three years. Vacuum cleaners were used the longest -- 44 percent were used eleven years or more. Kitchen aid products fell between these extremes with 32 percent used less than three years and 21 percent used eleven years or more.

TABLE 2.4.8
YEARS OF USE BY PRODUCT TYPE CATEGORY

Product type category	Percent of products used: 0-2 yrs	3-5 yrs	6-10 yrs	11 yrs & over	n
Kitchen aid	32	27	21	21	144
Personal care	51	21	19	9	63
Vacuum cleaner	9	25	22	44	32

Significance $\leq .001$

2.4.6 Purchase price, product type, and products thrown away

Table 2.4.9 shows the relationship between product price and the disposal option "thrown away" for the products covered in the survey. There appears to be some consistency for products costing more than $30, in that televisions, vacuum cleaners, and toaster ovens were rarely thrown away; however, no consistent pattern is revealed for products costing less than $30. For example, the median prices recorded for mixers ($20), coffee makers ($20.50), blow dryers ($20), and bonnet hairdryers ($20) are similar, yet the percent of these products that were thrown away vary widely. Hence, at least for products costing below $30, purchase price alone may not adequately explain the relationship between product type and the disposal option "thrown away".

TABLE 2.4.9
MEDIAN PRICE OF PRODUCTS AND
PERCENT BEING THROWN AWAY

Product	Median price of product (dollars)	Percent thrown away
Toaster	17.50	29
Toaster oven	32.50	0
Mixer	20.00	19
Can opener	15.00	30
Coffee maker	20.50	31
Blender	22.00	17
Skillet	25.00	10
Blow dryer	20.00	42
Bonnet hairdryer	20.00	19
Elec. toothbrush	19.00	20
Television (B&W)	125.00	7
Radio	35.00	13
Vacuum cleaner*	54.50	0
Iron	15.50	32

(see footnote on next page)

2.4.7 Criteria for purchase, product type, and disposal option

Analysis of the data revealed that the consumers of different products displayed significant variations (at the 95 percent confidence level) in assessing the importance of three purchasing criteria: reliability, appearance, and instructions. Variations for the criteria of "appearance" and "instructions" were significant only when products were grouped into three categories, but came close to being considered significant when product types were not grouped together.

Complete data on the importance of reliability as a purchasing criterion, as judged by the consumers of different products, are given in table 2.4.10. The sample size in most of the cells is very small, and caution must be shown in drawing conclusions. Shown in table 2.4.11 are data on the importance of reliability for three product type categories. These tables together imply that reliability was most important in the purchase of kitchen aid appliances and least important in the case of vacuum cleaners. The survey did not provide any explanations of why, for example, only 35 percent of consumers of vacuum cleaners had rated reliability as extremely important, while a greater proportion of consumers of toasters (87 percent) and irons (78 percent) had given this rating. It might be hypothesized, though, that consumers tend to be most concerned about reliability in products on which they rely for regular and frequent use, and for which no substitute exists to perform the function of that appliance. Other explanations are also possible. For example, consumers might believe that all vacuum cleaners are equally reliable, and so reliability is not rated highly as a purchasing criterion for these appliances. Alternatively, there might be differences in the interpretations given to the term "reliability" itself by consumers of different products.

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* The median price of vacuum cleaners may not reflect the existing market price of new vacuum cleaners. As pointed out in table 2.4.17, 25 percent of all vacuum cleaners were obtained "used".

TABLE 2.4.10
IMPORTANCE OF RELIABILITY IN PURCHASE DECISION,
BY PRODUCT TYPE

Appliance	Percent indicating reliability to be: Extremely important	Important	Somewhat important	Not important at all	n
Toaster	87	13	0	0	15
Toaster oven	62	25	13	0	8
Mixer	70	30	0	0	10
Can opener	55	33	6	6	18
Coffee maker	70	30	0	0	10
Blender	64	36	0	0	11
Skillet	66	17	0	17	6
Blow dryer	54	39	0	7	28
Bonnet hairdryer	56	33	0	11	9
Elec. toothbrush	50	0	50	0	2
Television (B&W)	67	33	0	0	18
Radio	57	0	14	29	7
Vaccum cleaner	35	50	15	0	17
Iron	78	22	0	0	9

Significance = .0383

TABLE 2.4.11
IMPORTANCE OF RELIABILITY IN PURCHASE DECISION,
BY PRODUCT TYPE CATEGORY

Product type category	Percent indicating reliability to be: Extremely important	Important	Somewhat important	Not important at all	n
Kitchen aid	68	26	3	3	77
Personal care	54	38	0	8	38
Vacuum cleaner	35	50	15	0	19

Significance = .0044

Products grouped into three product type categories varied significantly as to the importance of appearance and instructions to consumers making purchase decisions. Product appearance was most important in the case of kitchen appliances, products which are perhaps more likely to be in view than vacuum cleaners or personal care items (see table 2.4.12). Instructions were most important in the case of kitchen aid products and least important in the case of personal care items (see table 2.4.13). Some kitchen aid appliances may be more difficult to operate (blenders, mixers with attachments) than the other types of items.

TABLE 2.4.12
IMPORTANCE OF APPEARANCE IN PURCHASE DECISION,
BY PRODUCT TYPE CATEGORY

Product type category	Percent indicating appearance to be: Extremely important & important	Somewhat important	Not important at all	n
Kitchen aid	47	30	23	77
Personal care	24	31	45	38
Vacuum cleaner	21	16	63	19

Significance = .0152

TABLE 2.4.13
IMPORTANCE OF INSTRUCTIONS IN PRODUCT PURCHASE DECISION
BY PRODUCT TYPE CATEGORY

Product type category	Percent indicating instructions to be: Extremely important & important	Somewhat important	Not important at all	n
Kitchen aid	65	9	26	77
Personal care	35	30	35	38
Vacuum cleaner	50	11	39	19

Significance = .0168

2.4.8 Pattern of new acquisition, product type, and disposal option

The percentages of consumers who had acquired replacement products for those disposed of, by product type, are given in table 2.4.14.* There appears to be a significant variation in the rate of replacement among different products. Blow dryers, the highest percentage of which had been thrown away, seem to have been replaced the most. The rate of replacement for irons which were second highest on the list of products "thrown away" was also relatively high. But the same was true for vacuum cleaners, none of which had been thrown away. The rate of acquisition may not depend on disposal option but rather on the consumer's attitudes regarding the dispensibility of particular products.

* It was considered in the survey that a consumer had replaced a product that was disposed of if a similar product (i.e., one in the same product category) had been acquired. Thus a consumer who had acquired a food processor after disposing of a blender did not qualify as having obtained a replacement.

The low rate of replacement of bonnet hairdryers is consistent with the suggestion that many were stored following the growth in popularity of blow dryers. Similarly, a switch to color televisions could explain the low rate of replacement of black and white televisions. The fact that many blenders and mixers were not replaced (and the blenders were mostly stored in working condition) could mean that new products (i.e., food processors) had taken their place. Percolator coffee makers could have been abandoned in favor of the newer drip-type products or possibly instant coffee. On the other hand, it seems plausible that electric can openers, skillets, and toothbrushes may not have been replaced since they had been "fad" items. However, the survey did not provide adequate information to confirm or deny these suppositions.

TABLE 2.4.14
PRODUCT REPLACEMENT BY PRODUCT TYPE

Appliance	Percent of respondents who: Obtained a replacement	Did not obtain a replacement	n
Toaster	60	40	35
Toaster oven	36	64	11
Mixer	38	62	21
Can opener	42	58	33
Coffee maker	50	50	16
Blender	48	52	23
Skillet	30	70	10
Blow dryer	78	22	41
Bonnet hairdryer	24	76	21
Elec. toothbrush	0	100	5
Television (B&W)	31	69	29
Radio	56	44	16
Vacuum cleaner	73	27	34
Iron	63	37	16
All products	51	49	311

Significance $\leq .001$

When product types are grouped together (table 2.4.15) the data show that kitchen products were replaced the least often and vacuum cleaners were replaced most frequently. This information appears to lend support to the conclusions drawn from table 2.4.14.

TABLE 2.4.15
PRODUCT REPLACEMENT BY PRODUCT TYPE CATEGORY

Appliance	Percent of respondents who: Obtained a replacement	Did not obtain a replacement	n
Kitchen aid	47	53	145
Personal care	57	43	63
Vacuum cleaner	75	25	32

Significance = .0122

Table 2.4.16 indicates the percentages of disposed and replacement products that had been obtained as gifts. It is interesting that for most product types, fewer replacement than disposed products were obtained as gifts, the most striking exceptions being skillets and coffee makers, for which significantly more replacement products were obtained as gifts. Though the consumer responses do not explain these variations, it might be hypothesized that when a new product first appears on the market, it is frequently given as a gift; this hypothesis is supported by the fact that many new products appear on the market around Christmas time (i.e., the season when many gifts are normally given). Once a consumer has received a new appliance as a gift, it may be that a dependence on that appliance often develops, so that when the original one is disposed of, another is purchased as a replacement.

TABLE 2.4.16
PRODUCTS RECEIVED AS GIFTS, BY PRODUCT TYPE

Appliance	Percent received as gifts, of: Products disposed	Replacement products
Toaster	49	38
Toaster oven	27	0
Mixer	48	50
Can opener	42	36
Coffee maker	38	62
Blender	32	18
Skillet	40	67
Blow dryer	27	13
Bonnet hairdryer	48	40
Elec. toothbrush	62	0
Television (B&W)	31	33
Radio	31	22
Vacuum cleaner	38	20
Iron	38	0

2.4.9 Second-hand markets

Table 2.4.17 indicates how many products had been acquired used rather than new. It is apparent that the variation between product types was generally insignificant. Most had been obtained new; the exceptions were vacuum cleaners and bonnet hairdryers.

TABLE 2.4.17
NEW/USED PRODUCT WHEN OBTAINED, BY PRODUCT TYPE

Appliance	Percent of products: Obtained new	Obtained used	n
Toaster	94	6	16
Toaster oven	100	0	8
Mixer	90	10	10
Can opener	89	11	18
Coffee maker	100	0	10
Blender	91	9	11
Skillet	100	0	6
Blow dryer	97	3	29
Bonnet hairdryer	78	22	9
Elec. toothbrush	100	0	2
Television (B&W)	83	17	18
Radio	87	13	8
Vacuum cleaner	75	25	20
Iron	100	0	10
All products	90	10	175

Significance = .4150

2.4.10 Satisfaction with products

Table 2.4.18 indicates how many respondents were satisfied with the amount of use obtained from their products. It appears that those who had disposed of blow dryers, can openers, bonnet hairdryers, toaster ovens, and blenders expressed dissatisfaction more frequently than other respondents. As indicated earlier in table 2.4.1, a large proportion of these appliances had been either thrown away or stored. However, this is not to say that most products which are thrown away or stored are necessarily considered unsatisfactory by their owners, for (as table 2.4.18 shows), most respondents were satisfied with irons, radios, and coffee makers, all of which had been thrown away or stored relatively often.

Although the survey responses did not provide adequate information to

fully explain why consumers were, or were not, satisfied with the amount of use obtained from their products, a few observations are pertinent. As indicated in table 2.4.6, most of the products with a relatively high proportion of dissatisfied owners tended to have low median years of use (blow dryers, coffee makers, blenders, and toaster ovens). Bonnet hairdryers were the only exception, with nine years' median use. However, four other product types (irons, skillets, mixers, and toasters) had the same median years of use (five years) as toaster ovens but respondents were satisfied with these products 80 percent of the time or more.

TABLE 2.4.18
SATISFACTION WITH AMOUNT OF USE OF PRODUCT, BY PRODUCT TYPE

Appliance	Percent of respondents: Satisfied with amount of use	Not satisfied with amount of use	n
Toaster	80	20	35
Toaster oven	73	27	11
Mixer	81	19	21
Can opener	69	31	32
Coffee maker	87	13	16
Blender	73	27	22
Skillet	80	20	10
Blow dryer	61	39	41
Bonnet hairdryer	71	29	21
Elec. toothbrush	80	20	5
Television (B&W)	100	0	29
Radio	94	6	16
Vacuum cleaner	87	13	32
Iron	93	7	14
All products	79	21	305

Significance = .02

For products with the greatest numbers of dissatisfied owners, there appears to have been some discrepancies between years of expected use and years of actual use. For example, while only 9 percent of those disposing of toaster ovens had expected their products to be used for less than three years, in fact 27 percent were used for two years or less (see table 2.4.19). Only 18 percent of owners had expected their can openers to be used for less than three years, but the survey revealed that 36 percent were actually used for two years or less. It appears that the expectations of those disposing of blow dryers had

been relatively low, since as many as 60 percent had not anticipated using them for more than three years, and yet 70 percent did not remain in use beyond two years. However, caution must be used in attaching significance to these findings, since (as table 2.4.19 indicates) a very high proportion of respondents did not know how long they had expected their products to last, while those who did give a figure were presumably basing it on long term memory.

TABLE 2.4.19
YEARS OF EXPECTED USE OF PRODUCTS AT TIME OF ACQUISITION, BY PRODUCT TYPE

	Percent expecting product to last:				
Appliance	0-3 yrs	4-6 yrs	Over 6 years	Didn't Know	n
Toaster	12	23	37	29	35
Toaster oven	9	18	27	45	11
Mixer	14	19	38	29	21
Can opener	18	21	30	30	32
Coffee maker	19	31	12	38	16
Blender	14	18	23	46	22
Skillet	10	10	40	40	10
Blow dryer	58	22	7	12	41
Bonnet hairdryer	19	19	19	43	21
Elec. toothbrush	0	40	20	43	5
Television (B&W)	21	43	21	14	29
Radio	12	25	19	44	16
Vacuum cleaner	12	15	50	23	32
Iron	14	29	29	29	14
All products	21	23	27	29	305

Significance = .002

2.4.11 Summary of product characteristics

The information presented in this section on product type characteristics may be summarized as follows:

(i) Products thrown away generally did not work when discarded, but 64 percent of the products that needed repair were not thrown away.

(ii) Blow dryers, irons, and coffee makers were thrown away most often.

(iii) A significant percent of all product types were stored in working condition. These products may have belonged to respondents who had no use for their products or who preferred new ones.

(iv) Kitchen aid items were used longer, and were less likely to be thrown away, than personal care items.

(v) Products that generally cost over $30 (black and white televisions, vacuum cleaners, and toaster ovens) were seldom thrown away. For products costing $30 or less the effect of price on disposal option was unclear.

(vi) Respondents considered reliability to be important more often in their decisions to buy kitchen aid products than in their decisions to buy personal care items and vacuum cleaners.

(vii) Appearance and instructions also were considered important more often in decisions to buy kitchen aid products than in decisions to buy other products.

(viii) Blow dryers and vacuum cleaners were replaced most frequently. The majority of several types of kitchen appliances (toaster ovens, mixers, can openers, blenders, and skillets) were not replaced.

(ix) Product types most often obtained used rather than new were vacuum cleaners (25 percent obtained used) and bonnet hairdryers (22 percent.

(x) Respondents were dissatisfied most often with blow dryers, can openers, bonnet hairdryers, toaster ovens, and blenders, although the majority of respondents of each product type were satisfied with the amount of use obtained from their products.

2.5 Disposal Options and Price

2.5.1 Introduction

This section of the report attempts to further explain the choice of disposal option by examining the relationships among several different factors, with an emphasis on price. Product type variations for certain factors were described in section 2.4. This section will examine some of these same variables in an attempt to define product characteristics (irrespective of product type) that explain disposal option choice. As in the previous section, the six disposal options have been grouped into three categories, namely "thrown away", "stored", and "other" (which includes products given away, donated, sold, and traded-in).

The socioeconomic variables -- education, income, ethnicity, sex, and age -- proved unimportant in consumer disposal option decisions. However, significant age differences were found in the years of product use, a variable that differed significantly with disposal option. This information is discussed in section 2.5.6.

The study found significant associations between the disposal option variable and the following independent variables:

(i) product type;

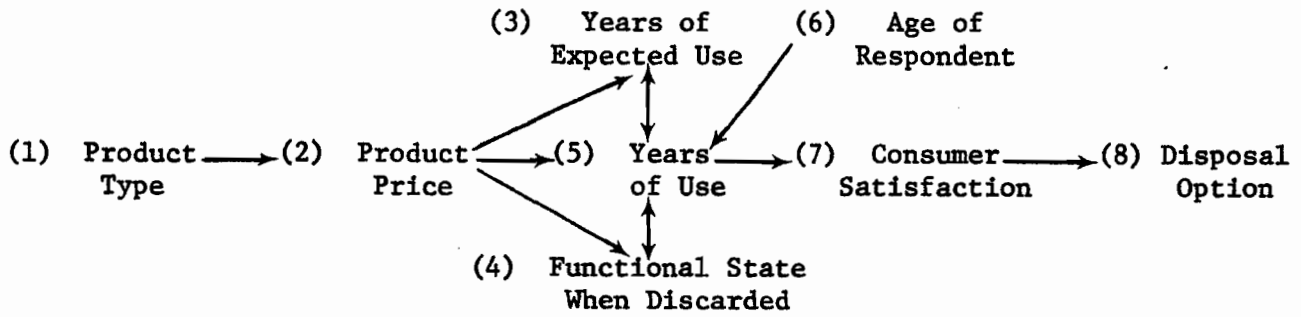
(ii) product price;

(iii) functional state of the product when discarded (i.e., whether it needed repair); and

(iv) consumer satisfaction with the length of product use.

Some variation was also found among the disposal options for the variables "years of use" and "years of expected use".* It is hypothesized that product type and perhaps product price are the original independent variables, since they were established prior to the other variables, being determined at the point of purchase. The other variables may help explain the associations of product price and type to disposal option. Figure 2.5.1 below shows the possible sequential order and relationships of these variables.

FIGURE 2.5.1
VARIABLES LEADING TO DISPOSAL OPTION



This figure hypothesizes that product type (1) influences the price paid for the product (2). The price in turn influences how long the consumer expects to use the product (2 to 3) and how many years the consumer actually uses the product (2 to 5).

Price also influences the functional state of the product at the time of disposal, given the years of product use (2 to 5 to 4).

Functional state and years of use might influence each other. For example, the product might be inexpensive, and break down quickly, and this might result in its disposal after a few years of use (4 to 5). Alternatively, the product

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* It was thought that price might be influenced not only by product type but also by whether the product was bought new or used. Used products would be expected to cost less than new products. However, the data did not support this reasoning. 66 percent of new products and 65 percent of used products had cost less than $30. This finding could be explained by the fact that a sizeable portion (57 percent) of the used products were either vacuum cleaners or televisions, both of which generally had cost over $30.

might need repair as the result of many years of use (5 to 4). It might be expected that the years the product has been used, and whether it needs repair (in light of the years of use), will influence consumer satisfaction (4 and 5 to 7). Consumer satisfaction may then lead to disposal option (7 to 8). It will be shown that years of expected use (at acquisition) may influence years of use, but also vice versa. Years of expected use may be a reflection of the years of actual use (3 to 5 and 5 to 3).

This schematic is probably an extremely simplified version of the actual process leading from consumer purchase to consumer disposal. Many other factors are likely to influence the variables outlined above: the frequency of product use,* the function the product performs, whether the product has become functionally or stylistically obsolete, or whether the product has been properly maintained and used, to name but a few possibilities. Doubtless, there are other variables besides price which explain the significant relationship between the independent variable, product type (1), and the dependent variable, disposal option (8). It is possible too, that variables not investigated thoroughly in the study are of importance in disposal option choice.**

The remainder of this section analyzes the hypothesized casual relationship between price and disposal option. It examines specifically the extent to which this relationship can be explained by the series of factors found to be associated directly or indirectly (through product price) with disposal option, as outlined in figure 2.5.1.

One word of caution should be added at this point. The survey findings derived from the variable "product price" apply only to that portion of the survey sample for which price was known. Of the 311 respondents interviewed, 184 (59 percent) claimed to have known the price of the product they had disposed of. It is possible that whether or not a respondent knew the product

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* Information on frequency of use was collected in the survey but because of the difficulty of accurately measuring the amount of use, and the problems of comparing the amount of use for different product types, the information collected is probably of little value (see section 2.3.6, above).

** This is particularly true of stored items, where a large number of the items are in working condition but are no longer used, perhaps because of style changes or product improvements. These factors were not focused on in the study.

price may have influenced disposal option choice;* thus conclusions based on price cannot validly be applied to the entire sample.

Furthermore, the product prices may not be strictly comparable. As mentioned in section 2.3.5 (above), the respondents had to rely on memory, and the accuracy of their responses may well have depended on the different lengths of time that had lapsed since their products had been acquired. Moreover, the prices of small electrical appliances have been changing over the past few years as the result of two influences, namely technological developments (which have tended to lower the prices) and inflation (which has tended to raise them).

2.5.2 Price and disposal option

Table 2.5.1 shows the distribution of disposal option by product price. About two-thirds of the entire sample, 70 percent of the stored items, and 88 percent of those thrown away had cost under $30. Forty-nine percent of the items disposed of in one of the other ways had cost under $30. The data appear to indicate that expensive items were generally not thrown away, while inexpensive items were disposed of in any manner. They do not explain why only certain inexpensive items were thrown away. Variables that may explain why some items were thrown away are examined next.

TABLE 2.5.1
PRODUCT PRICE BY DISPOSAL OPTION

Disposal option	Percent costing: Under $30	$30 and over	n
Thrown away	88	12	42
Stored	70	30	70
Other	49	51	72

Significance $\leq .001$

2.5.3 Functional state and disposal option

The relationship between "price" and the disposal option "thrown away" might be explained by one or more of the other factors associated with disposal option. Table 2.5.2 shows the relationship between the variable

* Prices were known for 65 percent of the items thrown away, 55 percent of the stored items, and 61 percent of the other items.

"disposal choice" and "functional state when discarded". This table follows a similar pattern to that of disposal choice by price. Products thrown away needed repair (when disposed of) 95 percent of the time. Stored items needed repair less often (about the same percent as that for all the products combined), and the other options needed repair the least often.

The repair factor seems to almost completely explain the relationship between purchase price and disposal option for products "thrown away". Table 2.5.3 shows products that were thrown away and compares price and functional state when discarded. Only one product (for which price was known) was thrown away without needing repair. All of the products costing $30 and over, and 97 percent of the products under $30, were thrown away in need of repair. This indicates that the correlation between low price and the disposal option "thrown away" can be explained by the repair factor. It appears that products were thrown away because they needed repair, not because they were inexpensive. However, one might expect the inexpensive items to break down more readily than items costing $30 or more.

TABLE 2.5.2
FUNCTIONAL STATE OF DISCARDED PRODUCTS, BY DISPOSAL OPTION

	Percent of products:		
Disposal option	Needing repair	Not needing repair	n
Thrown away	95	5	65
Stored	53	47	128
Other	32	68	115

Significance $\leq$ .001

TABLE 2.5.3
FUNCTIONAL STATE OF THROWN AWAY PRODUCTS, BY PRICE

	Percent of products:	
Price	Needing Repair	Not needing repair
Under $30	97	3
$30 and over	100	0

The repair variable is less helpful in explaining why items were stored or disposed of in one of the other four ways. Table 2.5.4 compares the repair and price variables for products that were stored. More than half of the products stored, in both price categories, needed repair. While the percent of items in need of repair was lower than for items thrown away, non-functioning products still accounted for a majority of stored items. Why were these products stored rather than thrown away? The repair variable does not answer this question.

The products disposed of in some other way are shown in table 2.5.5 which compares price and functional state when discarded. Of the three disposal categories, only the "other" category has a minority of products (regardless of price) in need of repair. Interestingly, fewer of the less expensive items needed repair than the items costing $30 and more. It appears that the more expensive items, though in need of repair 43 percent of the time, were still of sufficient value to someone, to be traded, sold, given away, or donated.

TABLE 2.5.4
FUNCTIONAL STATE OF STORED PRODUCTS, BY PRICE

	Percent of products:	
Price	Needing Repair	Not needing repair
Under $30	59	41
$30 and over	52	48

TABLE 2.5.5
FUNCTIONAL STATE OF PRODUCTS IN THE "OTHER" DISPOSAL CATEGORY, BY PRICE

	Percent of products:	
Price	Needing Repair	Not needing repair
Under $30	27	73
$30 and over	43	57

To summarize, the functional state of products when disposed of explains why low priced products were thrown away. It does not explain why inexpensive

items in need of repair were stored. It helps to explain why some products were disposed of by one of the "other" options. These products were generally more expensive and in need of repair less often. In this category, the more expensive items needed repair more often than less expensive items, implying that even products in need of repair may have value to someone else if they cost $30 or more.

2.5.4 Years of use and disposal option

The variable "years of use" may partially explain why some items needing repair were thrown away and others were stored. The mean years of use for products thrown away had a probability of varying significantly from the mean years of use of all products 95 percent of the time (see table 2.5.6). The mean years of use for all products was 6.59 years; the mean for "thrown away" products was 4.68 years. In contrast, the mean years of use for "stored" and "other" products was slightly higher than the mean for all products but did not differ from it significantly. This information suggests that thrown away items were generally inexpensive products that had become inoperative after a few years of use. The "years of use" factor may have distinguished inexpensive, non-functioning, thrown away items from the same category of stored items. Items that had become inoperative after the consumer had used the product for a satisfactory length of time might have been stored more often than thrown away.

TABLE 2.5.6
MEANS YEARS OF PRODUCT USE, BY DISPOSAL OPTION

Disposal option	Mean years of use	n
Thrown away	4.68	63
Stored	7.15	123
Other	7.04	113
All	6.59	299
Confidence interval	(5.87 - 7.31)	

Confidence level = .05
Standard deviation = 6.33

2.5.5 Price, years of use, and disposal option

A significant association between price and years of use seems logical since price might have affected the rate of disfunction; in turn, inoperative

products might have been discarded. The data confirm this assumption. Table 2.5.7 shows that 79 percent of the products used from zero to three years had cost under $30, 62 percent of the products used from four to six years had cost under $30, and 52 percent of the products used for more than six years had cost under $30. This suggests that the number of years a product was used increased as price increased. There could be at least two explanations for this:

(i) more expensive items might not have become inoperative as quickly as inexpensive items and might, therefore, have been used longer; and

(ii) less expensive items might have been discarded more quickly than expensive items, regardless of their functional state, because they represented a smaller consumer investment.

TABLE 2.5.7
PRODUCT PRICE BY YEARS OF USE

Years of use	Percent of products costing: Under $30	Over $30	n
0 - 3	79	21	75
4 - 6	62	38	42
Over 6	52	48	63
All products	66	34	180

Significance = 0.0045

Table 2.5.8 shows the mean years of product use for different price ranges and different disposal options. Price had no effect on the years of use of thrown away products; inexpensive items lasted an average of 4.62 years, and more expensive items lasted an average of 4.40 years. However, stored items that had cost $30 and over differed significantly from the less expensive items as to mean years of use. Since the more expensive stored items lasted an average of 10.71 years, it appears that "years of use" might have played a role in the decision to store or throw away. Possibly, owners were more likely to store rather than throw away products that had given "good service" (i.e., when they had given many years of use). Products in the "other" category did not differ significantly by price as to mean years of use, but were used longer than products thrown away.

2.5.6 Years of use and consumer satisfaction

How many years of use are considered satisfactory by consumers? It may be reasoned that satisfaction with the years of use will depend on how long a consumer expected the product to last. 80 percent of the consumers were satisfied with the years of product use. Products generally did last the number of years expected. Table 2.5.9 compares the mean years of expected use and the mean years of actual use for each disposal option category. The table indicates that in only 5 percent of the cases would one expect to find significant deviations in the mean value for years of use and years of expected use.

TABLE 2.5.8
YEARS OF USE BY PRICE AND DISPOSAL OPTION

Disposal option	Mean years of use for products: Under $30	$30 and over		n
Thrown away	4.62	4.40	No significant difference	42
Stored	6.23	10.71	Significant variation at .05 confidence level	68
Other	5.41	7.42	No significant difference	70

Confidence intervals at .05 confidence level = 5.84 - 9.40
Standard deviation = 7.47

TABLE 2.5.9
YEARS OF EXPECTED USE AND YEARS OF ACTUAL USE, BY DISPOSAL OPTION

Disposal option	Mean years of expected use	Mean years of actual use	n	Standard deviation*
Thrown away	5.17	4.68	52	3.43
Stored	6.37	7.15	87	5.13
Other	8.04	7.04	78	6.18

* Confidence levels indicate no significant deviation in years of use and years of expected use 95 percent of the time.

Since the years of actual use generally met expectations for each of the disposal option categories, one might expect equal consumer satisfaction among disposal options as to years of use. However, table 2.5.10 shows that there was significant variation among disposal options as to consumer satisfaction (43 percent of the dissatisfied respondents threw away products). People who threw items away were less satisfied than others. Table 2.5.11 shows that years of use was important to satisfaction. The mean years of product use was 2.91 years for those who were dissatisfied, but 7.71 years for those who were satisfied.

TABLE 2.5.10
PERCENT SATISFIED WITH YEARS OF USE, BY DISPOSAL OPTION

Disposal option	Percent who were: Satisfied	Not satisfied	n
Thrown away	58	42	65
Stored	84	16	127
Other	86	14	113
All	79	21	305

Significance $\leq .001$

TABLE 2.5.11
YEARS OF USE AND SATISFACTION WITH YEARS OF USE

Satisfied	Mean Years of use	n
Yes	7.71	241
No	2.91	58
Mean	6.59	299
Confidence Interval	(5.98 - 7.33)	

Confidence level = .05
Standard deviation = 6.33

One might conclude that while years of use is important to consumer satisfaction, such satisfaction is not necessarily determined by whether years of use equals years of expected use.

It was found that years of use and expected years of use varied significantly with the age of respondents. Table 2.5.12 shows that 56 percent of the post-retirement age respondents had products which were over six years old when discarded, and 55 percent of the young adults used products for three years or less. Expected years of use followed a similar pattern; 42 percent of the young adults expected products to last three years or less, while 49 percent of the post-retirement respondents expected products to last more than six years.

TABLE 2.5.12
YEARS OF USE BY AGE OF RESPONDENTS

Age of respondents	Percent of products used: 0-3 yrs	4-6 yrs	Over 6 yrs	n
Young adults (18 - 24 years)	55	38	7	42
Adults (25 - 64 years)	43	23	34	201
Post-retirement (65 years and older)	26	18	56	50

Significance $\leq .001$

It is possible that years of expected use (as recorded in the survey) was influenced by years of actual use. One might also infer from table 2.5.11 that consumers were likely to be dissatisfied with products that lasted about three years or less.

2.5.7 Summary of findings

The information presented above suggests the following tentative conclusions:

(i) Thrown away items almost always needed repair, had been used fewer years than the other products, and generally were inexpensive.

(ii) Stored items, while frequently needing repair, were used longer than thrown away items.

(iii) Items used less than three years generally had cost less than $30.

(iv) Items disposed of in a manner that increased their chances of continued use tended to be relatively expensive, in working order when discarded, and older -- they had more years of use.

(v) Older respondents used products longer than younger respondents.

(vi) Consumers were likely to be dissatisfied with products that lasted three years or less.

(vii) Although the data are insufficient to conclusively confirm or deny the hypothesis, it seems possible that product type and price are linked with disposal option as illustrated in figure 2.5.1 (page 35), with "functional state when discarded", "years of use", and "consumer satisfaction" acting as explanatory variables. Further study is needed to obtain stronger evidence.

2.6 Consumer Attitudes and Behavior Affecting Product Durability

2.6.1 Introduction

The first part of the questionnaire focused on how each respondent acquired, used, and disposed of a particular small electrical appliance. The second part of the questionnaire sought information on consumer attitudes toward the use and disposal of small electrical appliances generally. On the subject of product durability, the opinions expressed by respondents in this latter section often appear to contradict those implied by the specific actions of the respondents in determining the lifetime of one particular product.* By comparing the actions of consumers with their expressed opinions, a clearer picture may be drawn of how consumers are likely to respond to changes in product durability, prices, and information.

The disparity between consumer actions and their opinions, as evidenced by the survey results, is important in relation to three basic issues, namely:

(i) whether, if products were to be made more durable (through technical innovations) without any increase in price, consumers would use these products longer;

(ii) whether, if more durable products were to cost more, consumers would be willing to pay the higher prices, and whether they would use their products longer; and

(iii) whether, if more information on product durability were made available to consumers, they would use this information when making purchase decisions.

These issues are discussed in detail below, based on the information obtained from responses to both parts of the questionnaire.

2.6.2 Consumers' likely response to an increase in product durability without any increase in price

Consumers' opinion statements suggest that they might use products longer

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* As pointed out in section 2.3.1, respondents may have tended to give "socially desirable" answers to some of these attitudinal questions.

if they were made more durable.* A majority of the respondents expressed disappointment with the durability of all small electrical products that they buy (not just the products surveyed) and the belief that products break down too soon. Almost all respondents (96 percent) indicated that they "always look for durable products". Furthermore, 75 percent felt that products "aren't built as well as they used to be", and 65 percent agreed that "manufacturers design products to wear out in a few years". Only 35 percent agreed that today, manufacturers devote greater attention to "performance standards and product durability" (see table 2.6.1).

TABLE 2.6.1**
ATTITUDES REGARDING PRODUCT DURABILITY

Statement	Percent who: Agreed	Disagreed	No opinion
I always look for durable products	95	4	-
I am often disappointed with the durability of the products I buy***	56	41	3
Products break down too soon these days***	54	37	9
Products aren't built as well as they used to be	75	18	7
Manufacturers design products to wear out in a few years	65	25	10
Today greater attention is devoted by manufacturers to performance standards and product durability	35	49	16

Total number of respondents = 311

*The precise meaning imputed to the term "durability" by consumers was not specified, although the questionnaire referred to the length of time a product might last. It is possible that some consumers confused the terms "durability", "reliability", and "performance".

** For this and subsequent tables in this section, "agree" includes those who strongly agreed or agreed with the statement, "disagree" includes those who strongly disagreed or disagreed with the statement, and "no opinion" includes those who indicated they had no opinion or who did not answer the question. Number of cases equals 311 for all tables.

*** 56 percent indicated disappointment with the durability of products; 59 percent indicated products break down too soon, implying that at least some of the respondents do not consider durability and length of use synonymous.

Most respondents (88 percent) who had purchased products (rather than obtaining them as gifts) said that product durability was an important factor in their purchase decision. However, 19 percent of all the products were stored in usable condition (although some may have been gifts) and 79 percent of all respondents claimed to be satisfied with the amount of use received from their products, which had a median of 9.6 years of use (the mean being 6.6 years).

It should be noted, though, that 23 percent of all products broke down within three years of their purchase. The products of dissatified consumers lasted an average of 2.9 years. This information seems to imply that consumers did not consider products sufficiently durable that lasted three years or less. The products of satisfied consumers lasted an average of 7.7 years. Exactly how long a product must last for consumers to consider it a "durable" product is not clear.

Style changes appeared to have some impact on the length of time products were used. Since 47 percent of the stored items did not need repair, the decisions to store these items must be attributed to something else. Fifty-two percent of the respondents agreed that "products are often old fashioned before they are worn out", and 45 percent like "modern stylish products". About a third of the respondents said that they "get tired of products after a few years" and about a quarter indicated they would replace a product though still useful (see table 2.6.2). These statements are consistent with the reasons respondents gave for disposing of their products. About 25 percent of the respondents disposed of their products because they preferred new ones. Approximately another 25 percent of the respondents indicated they discarded products because they had no use for them.* It is doubtful that increased product durability would change the lifetimes of products disposed of for these reasons.

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* Respondents had no use for products because:

(i) their lifestyles had changed;

(ii) they couldn't use a product received as a gift;

(iii) they found they did not like the function the product performed (i.e., preferred a manual can opener, etc.); or

(iv) they did not like the way a particular product performed.

TABLE 2.6.2
ATTITUDES REGARDING PRODUCT STYLE CHANGES

Statement	Percent who: Agreed	Disagreed	No Opinion
Often a product is old fashioned before it's worn out	52	43	5
I like modern, stylish products	45	47	8
I get tired of some products after a few years	33	64	3
I sometimes replace a product even though it is still useful	26	74	-

Total number of respondents = 311

2.6.3 Consumers' likely response to an increase in product durability accompanied by an increase in price

In the opinion statements, 84 percent of the respondents said they would "gladly pay more for more durable products" and 79 percent agreed that "you have to pay more for durable products". But there is evidence to suggest that most consumers tried to obtain products at the lowest possible cost. All but a few respondents agreed that they "always look for the best buy for the money" (90 percent agreed) and 65 percent said price was an important factor in their purchase decision.

Many consumers believed that they obtained a product of higher than average quality without paying a higher than average price. Twenty-three percent of the respondents disposing of products ranked the price of their product above average, but 43 percent ranked the quality of their product above average. These percentages may not accurately reflect the actual market costs and quality levels of the products surveyed, but they do reflect the perceptions consumers had of their products. There may have been an unconscious desire on the part of respondents to believe that they had obtained "the best buy for the money".

Thus, although consumers may say that they want durable products, the data suggests that as long as less expensive, less durable products are available, a significant proportion of the consumer population is likely to purchase them.

There is some evidence to suggest that those who would pay more for increased durability might indeed use their products longer. The data show that the less expensive products covered in the survey tended to break down and were thrown away after a relatively short period of time. More expensive products were used longer; this may have been because they did not break down as quickly or, if they did, the higher consumer investment may have made repair seem more economically worthwhile.

Furthermore, about half of the respondents (49 percent) indicated that they would discard a product that broke down without too much hesitation if it cost less than $20, whereas far fewer would do so if it cost less than $40 or $60 (see table 2.6.3). These responses appear to be generally consistent with the consumers' actual disposal behavior.

To summarize, it is difficult to predict whether consumers would actually pay more for more durable products, and if so, how much more. If those who decide to purchase more expensive items behave in a similar manner to those who bought more expensive products in the past, there is some reason to suppose that they might also use their products for longer periods of time.

TABLE 2.6.3
PRODUCT PRICE AND ATTITUDES REGARDING DISPOSAL

Statement	Percent who: Agreed	Disagreed	No Opinion
If a product costing less than $20 breaks down on me, I'm likely to discard it without too much hesitation	49	48	2
If a product costing less than $40 breaks down on me, I'm likely to discard it without too much hesitation	26	72	2
If a product costing less than $60 breaks down on me, I'm likely to discard it without too much hesitation	8	90	2

Total number of respondents = 311

2.6.4 Consumers' expected use of information on product durability

The majority of the respondents indicated that they want and use product information. About three-quarters of the respondents agreed that advertisements

and product labels should be made more informative. An overwhelming majority (approximately 85 percent) indicated that they "read labels and instruction books carefully" and "look for products with good warranties". Only 14 percent admitted that they "don't pay attention to the use and care booklets" made available to them (see table 2.6.4).

However, despite these claims, only 57 percent of the respondents (who had disposed of particular products) stated in the survey that they had actually kept track of the instructions accompanying those products, while still fewer (26 percent) said that they had followed the recommended maintenance schedules.

Approximately 71 percent of the consumers who had purchased their products (rather than receiving them as gifts) said that they had sought information on product durability and reliability. The majority of these (59 percent) had relied on informal sources (e.g., personal experience, a friend, relative, or sales clerk). Only 10 percent of those obtaining information (i.e., 7 percent of those purchasing products) had relied on a rating service such as Consumer Reports, a finding that seems to contradict the general claim made by 61 percent of the respondents that they refer to a rating service before making important purchases. Respondents did indicate, though, that the "manufacturer's reputation" was very important to their purchase decisions. Perhaps the manufacturer's reputation was used as a measure of durability. Of course, it is possible that the particular products covered in the survey had not been considered important purchases, which could explain the discrepancy between consumers' general statements and actual behavior in this case.

TABLE 2.6.4
ATTITUDES REGARDING PRODUCT INFORMATION

Statement	Percent who: Agreed	Disagreed	No opinion
Advertisements should be more informative	77	16	6
Labels on products should be more informative	75	21	4
I read product labels and instruction books carefully	86	13	1
I look for products with good warranties	84	14	1
I don't pay much attention to the use and care booklets that come with products	14	85	1
I refer to Consumer Reports or other consumer rating services before making important purchases	61	36	3

Total number of respondents = 311

There may be additional reasons why consumers might not use product ratings or other information relating to the purchase of small electrical appliances. One may be a lack of such information (relative to that on larger products) since the small appliance market is characterized by the frequent introduction of new styles as well as completely new products; it would be difficult for the rating services to keep up-to-date, and they may not try.* What information is available may not be very useful, and consumers may not be prepared to devote the time and effort necessary to become better informed, in view of the relatively low prices charged for the products.

On the one hand, consumers said that they want more information about products, but on the other hand, only some of them used that which is presently available. Some possible reasons for this discrepancy can be suggested, but additional information is needed to provide a complete explanation.

2.6.5 Summary

By comparing the behavioral responses of consumers toward specific products and the attitudinal responses of consumers for all small electrical appliances generally, the following conclusions can be drawn:

(i) Consumers were often dissatisfied with products that lasted less than three years.

(ii) It is not clear how long products must last for consumers to consider them sufficiently durable, but the products of "satisfied" consumers lasted an average of 7.7 years.

(iii) About 25 percent of the respondents disposed of their products because they preferred new ones.

(iv) Extending product durability presumably would have had an effect on the 25 percent of the respondents who had no use for the products they discarded.

(v) While more expensive items were used longer, it is not clear if and how much respondents would have been willing to pay for more durable products. Generally, respondents looked for "the best buy for the money".

(vi) While people claimed that they followed instructions accompanying products, few kept track of the instructions which came with their discarded products.

(vii) It appears that the manufacturer's reputation and personal experience were the sources most frequently relied on for information about product durability.

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* While Consumer Reports rated major household appliances at least twice between 1975 and 1977, they did not rate can openers, bonnet and blow hairdryers, and toothbrushes at all, and rated coffee makers and skillets only once.

2.7 Further Analysis of Attitude Statements

The attitude statements were further analyzed in an attempt to discover variables that will distinguish among individuals who choose different means of disposing of small electrical appliances, with the intent of developing profiles of the consumers in the segments.

Two stages of analysis were conducted: first, a factor analysis of the attitude statements to reduce the data; and second, a discriminant analysis to identify the distinguishing variables. The factors which emerged in the first stage were used to generate factor scores which served as independent "lifestyle" variables in the discriminant analysis, both separately and in combination with demographic variables.

2.7.1 Factor analysis

In the first stage of the analysis, the attitude statements were factor analyzed via principal components analysis after eliminating statements with very little variability. An eight factor solution accounted for 44.4 percent of the variance. The variables which made up the first seven factors are shown in appendix E (the eighth factor captured error variance) and are summarized as follows:

Factor 1 - "Cynics" - An individual who scores high on this factor is skeptical regarding the durability and repairability of small electric appliances and of the motives of manufacturers of such products.

Factor 2 - "Hedonists" - A high score on this factor is related to a lifestyle that could be described as "wanting the latest with the least effort". The Hedonists will replace working products with more stylistic ones, are convenience oriented, and buy more products than they need.

Factor 3 - "Careless Consumers" - Those who do not put much effort into purchasing or caring for products would score high on this factor.

Factor 4 - "Trashers" - This factor reflects a proclivity to discard an appliance as soon as it malfunctions regardless of its purchase price. These individuals do not feel a responsibility to have a product repaired and will buy less expensive products so they can discard them without experiencing guilt.

Factor 5 - "Anti-Repairists" - Individuals who score high on this factor feel the repair industry is a "rip-off" -- It's inconvenient, expensive, time consuming, and so forth.

Factor 6 - "Pack Rats" - A high score on this factor would indicate a tendency <u>not</u> to permanently dispose of old appliances. Instead, the appliances are kept around the house, given away, or perhaps fixed by the individual.

Factor 7 - "Consumerists" - Individuals who score high on this factor endorse many of the concerns of the current consumerism movement (e.g., that labels and advertisements should be more informative, that the repair industry should be regulated, etc.).

The factor names are, of course, arbitrary and are used as a heuristic rather than as a concrete summarization of a dimension.

2.7.2 Discriminant analysis

Linear discriminant analysis was used to examine the set of independent variables to see which, if any, could distinguish among the various disposal options.

For the purposes of this analysis the dependent variable, disposition choice, was collapsed in two ways, the first representing more specific behaviors than the second:

(i) a four-group taxonomy:
- discard the product (no value to anyone); n = 65
- store the product (some value to the owner); n = 128
- sell, donate, or trade-in the product (monetary value to the owner); n = 62
- give the product to a friend or relative (value to someone other than the owner); n = 56

(ii) a two-group taxonomy:
- discard the product (no value to anyone); n = 65
- all others (some value to someone); n = 246.

For each taxonomy above, three separate discriminant analyses were performed. First, the lifestyle factor scores served as the independent variables, then the demographic variables, and finally a combination of both.

The discriminant coefficients for the significant functions from the two-group analysis are shown in table 2.7.1. In determining which variables contribute to an explanation of the nature of group differences, the common heuristic is to consider those with a standardized coefficient with an absolute value at least as great as one-half the value of the largest standardized coefficient. Applying this rule of thumb to the function containing only the lifestyle factors, Factors 4 (Trashers), 5 (Anti-Repairists), and 6 (Pack Rats) were the most important variables in differentiating between those who discarded products and those who recognized some value in the product. Factor 1 (Cynics) almost met the criterion. Individuals who threw a product away have a predisposition to do so, are not satisfied with the repair industry, and are not inclined to keep things around the house.

When the demographic variables were added to the analysis, the Anti-Repairist dimension no longer met the criterion for inclusion and the Cynic dimension no longer even approached importance. One demographic variable, age, seemed to be quite important.

A useful test of the power of a discriminant function is to examine its ability to correctly classify a set of subjects at a level which is greater than chance. Discriminant functions using the lifestyle factors alone and in combination with the demographics were able to correctly classify a significantly greater number of sample members into known groups (Discard or Value) than would have been correctly classified by chance. The combination of variables is slightly better than the lifestyle factors alone. Thus, the discriminant functions do have a measure of discriminatory power even though the percent correctly classified (60 percent) does not appear particularly overwhelming.

TABLE 2.7.1
DISCRIMINANT COEFFICIENTS

	Lifestyle factors		Combination	
Independent variable	Standardized	Unstandardized	Standardized	Unstandardized
Factor 1 - Cynics	.3091	.3448	.1285	.1434
Factor 2 - Hedonists	.0790	.0921	.0773	.0901
Factor 3 - Careless consumers	.1134	.1327	-.0130	-.0152
Factor 4 - Trashers	.6403	.7333	.5626	.6444
Factor 5 - Anti-Repairists	.3379	.3910	.2143	.2479
Factor 6 - Pack Rats	-.5182	-.6299	-.5241	.6371
Factor 7 - Consumerists	.1954	.2471	.0689	.0871
Age			.6847	.0419
Marital status			.0043	.0088
Education level			.1442	.0538
Occupation			.1343	.0461
Income			.2223	.0350
Constant		0		-3.1747

2.7.3 Discussion

The variables used in this study were not able to distinguish among the more specific disposition behaviors in the four-group taxonomy. Apparently the independent measures were not specific enough to capture the distinctions in the four-group case (if such distinctions actually exist). However, the variables were able to distinguish between consumers' disposition choices when the behavior was dichotomous -- discarding the product or recognizing some value in the product.

Important dimensions in explaining the differences between those who discarded the product and those that did anything else with it are the demographic variable age, and two of the lifestyle factors -- the Trasher and the Pack Rat dimensions. Note that the Trasher and Pack Rat dimensions are the most disposition behavior-specific of the lifestyle factors. It has been found in the past that the more specific an attitude measure, the stronger the empirical relationship between attitudes and a specific behavior. The issue of specificity is apparently important when studying the relationship between lifestyles and behavior as well.

The profile that emerges as one who discards a product is that of a younger individual (although both means are in the category "middle-aged"-- 38.2 versus 44.3 years), who has a tendency to throw products away as soon as any part malfunctions, and does not tend to keep products around the house in anticipation of later use, sale, or donation. Some of these tendencies may be the result of the individual's disenchantment with the repair industry. It may be noted that these findings have possible implications for policy development to extend product lifetimes (as discussed in section 5, below), although they are incomplete in that no analysis has yet been done of the reasons why the Trasher did not choose any of the other available options.

Also noteworthy are some of the variables which do not contribute to an understanding of group differences. Based on past consumer behavior research, it is not surprising that the demographic variables did not perform well. However, it was anticipated that more of the lifestyle factors would be important. One might have conjectured, for example, that disappointment with durability (Factor 1, Cynics) would be related to the choice of disposition method. A hedonist lifestyle, which one might associate with a throw-away lifestyle, is not a factor which distinguishes those who throw products away from those who do not, at least not with respect to the set of products examined here. Thus, the issue of product obsolescence (technological, stylistic, or otherwise) may not be related to disposition behavior. Further, those who do not care for their products are no more inclined to throw them away than are individuals who do care for their products and exercise concern when purchasing small electrical appliances.

2.8 Product Repair

2.8.1 Introduction

This section focuses on the factors affecting consumers' decisions to

have non-functioning products repaired.

As per table 2.8.1, 54 percent of all the products that were disposed of needed repair at the time of disposal. Further disaggregation of the data showed a significant relationship between the physical state of the product and the method of disposal (see table 2.8.2). Of the products that were either thrown away or stored, a total of 67 percent needed repair at the time of disposal.

TABLE 2.8.1
FUNCTIONAL STATE OF APPLIANCE AT TIME OF DISPOSAL

State of appliance	Percent
Not needing repair	46
Needing repair	54

Total number of respondents = 308

TABLE 2.8.2
FUNCTIONAL STATE OF APPLIANCE BY DISPOSAL OPTION

	Percent of products:		
Disposal option	Needing repair	Not needing repair	n
Thrown away	95	5	65
Stored	53	47	128
Other	32	68	115

Significance $\leq$ .001

Tables 2.8.3 and 2.8.4 present data relating to the percent of respondents who had considered repair as an option, and the reasons given for not doing so. Of those whose products needed repair at the time of disposal, 30 percent said they had actually considered having these products repaired, while around 70 percent gave as reasons for not repairing their beliefs that it would be too expensive, too inconvenient, etc. It appears that many respondents may have acted on the basis of an image of the costs and difficulties of repair, which may or may not have been an accurate reflection of the true situation.

TABLE 2.8.3
CONSIDERATION OF REPAIRING AS AN OPTION*

	Percent	n
Considered repairing	30	50
Didn't consider repairing	70	117

TABLE 2.8.4
PRIMARY REASONS FOR NOT REPAIRING INOPERATIVE PRODUCTS

Reason	Percent
Couldn't be repaired at reasonable price	25
Too busy, inconvenient to get to repair shop	14
Damaged beyond repair	13
Too old to repair	13
New model so much better that the old one wasn't worth repairing	10
Would take too much time to repair the old one	6
Wouldn't be worth much even if repaired (therefore not given to Salvation Army)	2
Repaired several times before	2
Had previous bad experience with repair shop	1
Other	14

Total number of respondents = 168

2.8.2 Relationship between functional state of products at time of disposal and demographic/socioeconomic characteristics of respondents

Cross tabulations failed to reveal any significant relationships between the functional state of a product at the time of disposal and the respondent's income level, education level, or ethnic background. However, there does appear to be a significant relationship with the respondent's age, as shown in table 2.8.5. Young adult and adult respondents disposed of functioning appliances less frequently (43 percent and 40 percent respectively) than respondents

* Limited to those respondents whose products needed repair at the time of disposal.

in the oldest age bracket (71 percent disposed of functioning products). However, respondents in the oldest age bracket used products longer than the other age groups: 56 percent of post-retirement respondents used products seven years or more while 18 percent of adults and 26 percent of young adults used products this long.

2.8.3 Relationship between functional state of products at time of disposal and purchase price

Table 2.8.6 suggests that there may be a significant relationship between a product's original purchase price and its functional state at the time of disposal.* The table shows that products costing below $30 were disposed of more frequently in a non-functioning state than were products costing over $30. However, as the purchase price increased to above $100, the number of products that needed repair at the time of disposal grew larger again.

TABLE 2.8.5
FUNCTIONAL STATE OF PRODUCT AT TIME OF DISPOSAL, BY AGE OF RESPONDENT

Age of respondent	Percent of products: Needing repair	Not needing repair	n
Young adult (18 - 24 years)	57	43	44
Adult (25 - 64 years)	60	40	207
Post-retirement (65 years and older)	29	71	51

Significance $< .001$

TABLE 2.8.6
FUNCTIONAL STATE OF PRODUCT AT TIME OF DISPOSAL, BY PRICE

Price range	Percent of products: Needing repair	Not needing repair	n
$1.00 - $15.00	62	38	47
$16.00 - $30.00	64	36	84
$31.00 - $45.00	40	60	10
$46.00 - $100.00	39	61	23
$101.00 - over	56	44	16

Significance = .05

* Care must be taken in attaching significance to this relationship since the sample included many more low cost than high cost products.

Responses to an attitudinal question elsewhere in the survey suggest that many of the inexpensive products may have been disposed of without much thought given to repair (see table 2.6.3). Respondents claimed that they would hesitate more before throwing away a more expensive product; one might suspect, therefore, that a deliberate decision had been made not to repair those products costing more than $100 (that were disposed of in a non-functioning state). Of course, some may have been transferred to new owners on the assumption that the latter would repair them.

2.8.4 Relationship between expected service cost of a particular appliance (as a function of its retail purchase price) and respondent's decision to have it repaired

The responses obtained to three attitudinal questions (see table 2.8.7) are consistent with the intuitive expectation that consumers would generally be influenced by the expected service cost when deciding whether to have a product repaired. Of course, other factors such as the expected life and performance of the product following repair are also likely to be important.

Table 2.8.8 lists and ranks the standard minimum labor cost for repairing each of a selection of products covered in the survey* as a fraction of its median purchase price. The ranking thus obtained was compared with a second ranking for the same set of products, the latter based on the percent of respondents who claimed that they found repair cost prohibitive for a particular appliance (see table 2.8.9).** Surprisingly, the Spearman correlation was insignificant at the 0.7 level*** However, it is interesting to

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* Other products are excluding owing to a lack of data on minimum labor cost of repair.

** Spearman's correlation was used to compare ranking. Rankings on two sets of scores were compared by squaring the differences between ranks, summing, and adjusting this measure so that its value would be +1.0 when the ranks were correlated, -1.0 when the ranks were in perfect opposition, and zero when the ranks were not related at all.

*** γ_s was calculated by the following formulae:

$$\gamma_s = 1 - \frac{6 \Sigma d^2}{n^3 - n} \quad \text{and} \quad z = \frac{\gamma_s - 0}{1/\sqrt{n - 1}} .$$

In this case, $\gamma_s = .33$ and $z = .89$.

TABLE 2.8.7
ATTITUDES REGARDING REPAIR

Statement 1: It is often cheaper to buy a new product than to have an old one repaired.

Opinion	Percent
Strongly agree	12
Agree	58
No opinion	8
Disagree	21
Strongly disagree	2

Total number of respondents = 310

Statement 2: It is too expensive to get many smaller products repaired.

Opinion	Percent
Strongly agree	12
Agree	64
No opinion	10
Disagree	13
Strongly disagree	1

Total number of respondents = 305

Statement 3: Some products are just not worth repairing.

Opinion	Percent
Strongly agree	10
Agree	70
No opinion	4
Disagree	14
Strongly disagree	2

Total number of respondents = 311

note that the Spearman correlation increased markedly* (though still remained below the level considered significant) when bonnet hairdryers were excluded from the sample; a possible reason is that bonnet hairdryers may have been disposed of more as a result of stylistic obsolescence (being replaced by blow dryers) than the need for repair.

TABLE 2.8.8
RATIO OF MEDIAN PURCHASE PRICE TO MINIMUM LABOR CHARGE FOR SERVICING

Appliance	Median price paid for product** (dollars)	Minimum labor charge repairing in authorized store*** (dollars)	Ratio of repair cost to purchase price	Rank
Toaster (2 slice)	17.50	7.00	.34	4.5
Can opener	15.00	5.00	.33	6
Coffee maker	20.50	7.50	.37	2
Blender	22.00	7.50	.34	4.5
Blow dryer	20.00	5.50	.28	7
Bonnet hairdryer	20.00	7.00	.35	3
Vacuum cleaner	54.50	11.50	.21	8
Iron (steam & other)	15.50	8.75	.56	1

2.8.5 Relationship between prior repairs and retail purchase price

Table 2.8.10 lists, by each product type, the percent that were repaired once or more before disposal.**** These were ranked and the ranks compared with another set of ranks based on median purchase price of the same set of products. No significant relationship was found at the 0.5 level of confidence. However, an examination of the table does suggest that there might be a difference in repair behavior for products costing more or less than about $30, which is consistent with the responses to the attitudinal questions elsewhere in the survey; a significant proportion of each of the more expensive products (vacuum cleaners, televisions, toaster ovens) had been repaired

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* γ_s changed from 0.33 to 0.59.

** Based on responses to the survey.

*** Based on responses to interviews with managers and owners of repair stores in Santa Monica.

**** For the overall 311 appliances, only 18 percent were repaired at least once or more before their disposal.

prior to disposal, while there was no observable pattern among the cheaper products.*

TABLE 2.8.9
RANKING PRODUCTS BY THE MAGNITUDE OF THE PERCENT OF PEOPLE WHO SAID REPAIR COST WAS PROHIBITIVE

Appliance	Percent of people who said repair cost was prohibitive	Rank	Rank from table 2.8.8, Statement 2
Toaster	15.0	6	4.5
Can opener	13.0	7	6
Coffee maker	33.3	3	2
Blender	50.0	1.5	4.5
Blow dryer	32.3	4	7
Bonnet hairdryer	0.0	8	3
Vacuum cleaner	23.1	5	8
Iron	50.0	1.5	1

TABLE 2.8.10
COMPARISON OF RANKS OF PRODUCTS BASED ON PERCENT REPAIRED BEFORE AND MEDIAN PURCHASE PRICE

Appliance	Percent repaired before	Rank (a)	Median Purchase price (dollars)	Rank (b)
Vacuum cleaner	41.2	1	54.00	2
Television (B&W)	37.9	2	125.00	1
Toaster oven	27.3	3	32.50	3
Elec. toothbrush	20.0	4	19.00	9
Iron	18.8	5	15.50	11
Blow dryer	17.1	6	20.00	6.33
Toaster	14.3	7	17.50	10
Blender	13.0	8	22.00	5
Elec. skillet	10.0	9	25.00	4
Can opener	9.1	10	15.00	12
Bonnet hairdryer	4.8	11	20.00	6.33
Coffee maker	0.0	12	20.00	6.33

* Appendix F contains an equation derived for predicting the costs of repairing products priced at less than $30.

2.8.6 Summary of Findings

(i) Nearly 50 percent of all the respondents had either thrown away or stored a product that needed repair.

(ii) Only 30 percent of all the respondents who had disposed of non-functioning products had considered getting their products repaired.

(iii) Nearly 70 percent of the consumers who had disposed of non-functioning products had not considered repairing because they believed it would be too expensive, too inconvenient, or impossible to repair their products.

(iv) Respondents who had disposed of non-functioning products tended to be evenly distributed among different income groups and different ethnic backgrounds. However, elderly people seem to have disposed of functioning products more frequently than adults or young people (although the elderly used products longer than other age groups).

(v) Inexpensive products (below $30) tended to be disposed of in a non-functioning state more frequently than expensive products, although the disposal of products needing repair showed signs of increasing again as the purchase price rose above $100.

(vi) Although it is reasonable to suppose that the ratio of repair cost to initial purchase price might have been the criterion used to judge whether repair cost was "prohibitive", the data do not bear this out.

(vii) No significant relationship was found for all products linking repairs prior to disposal with initial purchase price, although it did appear that the more expensive products were more likely to have been repaired. There was no observable pattern for products costing less than $30.

SECTION 3
INTERVIEWS WITH MANUFACTURERS

3.1 Introduction

Given that time and resources would not permit the identification and interviewing of all manufacturers of products covered in the study, the trade associations (AHAM and VCMA) were asked to suggest a number of companies that might together be expected to give a range of responses representative of the small appliance and vacuum cleaner industries as a whole (the television and radio industries were excluded from this part of the study). These companies were contacted directly and an outline was provided of the kinds of questions that would be asked. Despite assurances that requests for confidentiality would be respected, and that responses would not be linked with individual companies in the writing-up, several firms refused to participate in interviews or agreed to do so only in the presence of attorneys. In total, seven manufacturers of small appliances and three manufacturers of vacuum cleaners were interviewed, as well as two major retail chains that sell many of the products under private label.

The following sub-sections summarize the information and sentiments expressed in common by many or most of those interviewed; some company-specific responses are included as illustrations, but these cannot necessarily be generalized to other companies or to the industries generally. It is important to note that the company representatives interviewed held a variety of different positions in product management, marketing, testing, quality control, research and development, etc. Perspectives varied, and different people within the same company sometimes differed in their responses to some of the same questions.

The interviews sought information on manufacturers' decisions and attitudes in regard to:

(i) planning for the introduction of new products and changes in existing products;

(ii) factors influencing product design;

(iii) factors relating to product durability;

(iv) factors relating to product repairability;

(v) the operation of second-hand markets;

(vi) consumer behavior in product acquisition and disposal; and

(vii) policies designed to increase product lifetimes.

Although the interviewers kept roughly to a list of questions that had been prepared beforehand, the discussions were allowed to range fairly freely, which meant that there was considerable overlap between topics.

3.2 Planning for the Introduction of New Products and Changes in Existing Products

3.2.1 General considerations

Both industries are very competitive, with several well-entrenched, strong firms. The markets for many of the products are at or near saturation. In this situation, innovation and new product introductions were seen by those interviewed as essential to maintain a company's market share and profitability. However, great stress was laid on the importance of responding to consumers' needs; it was emphasized that any manufacturer who fails to satisfy these needs is unlikely to remain long in business.

Product planning was seen as a key activity. Most of the firms interviewed operate on a five-year planning horizon, while the development of an individual, fairly simple product appears typically to take about eighteen months. Inputs to the product planning process were said to come from consumers, from competitors and other firms in associated industries, from in-house research and development (R & D) departments, and through direct observation of societal shifts (i.e., shifts in living patterns, etc.). It may be noted that few firms claimed to directly consider the impacts of their products on society; most argued that there do not exist any good methods for doing so.

3.2.2 Consumer demand

None of those interviewed were prepared to discuss the specifics of their market research programs, so there was little discussion of how the companies determine what consumer "needs" really are. However, it was pointed out that demand for the products covered in the study has been influenced by trends in associated industries and in living patterns generally. For example, all of the vacuum cleaner manufacturers interviewed mentioned the fact that changes had to be made in the design of most vacuum cleaners to accommodate shag rugs. Small appliance manufacturers mentioned the need to respond to trends such as the rising interest in natural foods and the growth in "gourmet" home cooking (reflected in the market for food processors), changes in fashion (affecting the sales of hairdryers, irons, etc.), and so forth.

Almost all of those interviewed commented that change is a way of life in our society. Although most product modifications were said to be in response to changing consumer needs, as perceived, it was conceded by many that the industries themselves do play a significant role in fostering change. For example, one representative stated that his company deliberately encourages people to "trade up" to better products. While trends affecting consumer demand may not be industry-initiated, once observed they may be facilitated or encouraged by industry action. Thus, for example, it was stated that blow hairdryers were initially placed on the market in response to an observed trend in hair-drying practices and chosen hairstyles; however, it was the very availability of the new hairdryers that permitted this trend to fully develop.

3.2.3 Technological and stylistic innovation

None of those interviewed felt that their firms indulge in "product obsolescence" (referring to the deliberate introduction of needless innovation simply in order to promote consumer dissatisfaction with existing products), although one person considered that certain "fly-by-night" operators in the industry might do so. It was argued that companies must introduce new products in order to survive in the highly competitive market; more than one manufacturer expressed the need to introduce at least one new product each year. It was pointed out that buyers at the trade shows are typically interested primarily in "what's new". One of the small appliance executives interviewed felt that his industry is characterized by "one-upmanship" (within the constraints of "reasonable" prices). Many of the manufacturers felt that it is important to be a full-line manufacturer and to have a product for every price point within a line.

The claim was made that product changes which may appear to be stylistic only are, for the most part, accompanying technological changes; for example, the manufacturing process is being improved, or the product is being made more efficient. All the manufacturers mentioned the very high cost of making any change (e.g., a vacuum cleaner manufacturer estimated that it costs three million dollars to develop, test, and introduce a new model); this high cost precludes making changes that are only aesthetic, offering no real advantage to to the customer. However, making a technological change does provide an opportunity to make a stylistic change also, at little additional cost. All but two of the manufacturers made the point that it is essential for products on the shelves to look up-to-date; this is not so that customers will be tempted

to prematurely replace existing products, but simply to attract those who are in the market anyway (and thereby to sustain market share).

3.2.4 Research and development

Most companies are involved in research and development (R & D). Objectives of R & D were said to include:

(i) improving the performance, efficiency, or durability of a product (e.g., "making ironing easier");

(ii) investigating and overcoming problems in design or manufacturing identified through direct consumer contact or via the service network;

(iii) creative development.

3.2.5 Product elimination

Most respondens indicated that a product is eliminated from a product line when the market indicates insufficient continuing demand. Parts for a discontinued product are generally kept available for at least seven years; this, it was claimed, makes it apparent that existing products are not eliminated simply in order to force the purchase of a new product.

3.3 Factors Influencing Product Design

3.3.1 The external environment*

3.3.1.1 Resource availability

According to many manufacturers, changes in the availability of certain resources have affected the design of many of the products discussed, with the major change being the replacement of metals with plastics. It was claimed that this change has resulted in significant improvement, including the following:

(i) Today's plastics are more durable than the plastics originally introduced, and they are now often superior to metals (e.g., they do not rust, chip, crack , or peel).

(ii) Plastic products retain their original appearance longer than metal products, possibly encouraging consumers to retain them longer.

(iii) Plastic products are lighter in weight than metal products, and less energy is required to operate them.

(iv) Plastics are much easier to work with, and fewer parts are required per product.

(v) There are labor savings in both manufacturer and repair, since plastic products are easier to assemble and take apart.

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*The consumer environment was discussed in the previous section.

Concern with energy consumption has resulted in the manufacture of much more efficient products than were made ten years ago. However, many of those interviewed pointed out that small electrical appliances generally consume very little energy, measured either per use or over time.

3.3.1.2 Government involvement

The government has become increasingly involved in safety matters, and the issue of product liability is now of major concern when products are designed. Most manufacturers perceived a trend toward stricter liability; as a result, they are now deliberately designing products that consumers cannot take apart for home repairs. Energy conservation is attracting increasing government interest. It was mentioned that some states are proposing to ban certain small electrical appliances in order to conserve energy.

3.3.2 Product-specific features

The three factors most often mentioned as being important considerations in designing a product were durability, repairability (by trained repair personnel, not consumers), and style -- all within specified price parameters. The small appliance manufacturers were less concerned with designing for ease of maintenance than were the vacuum cleaner manufacturers. One large manufacturer reported having repair personnel participate directly in the design process. Durability and repairability are further considered in the following sections.

3.4 Factors Relating to Product Durability

3.4.1 Factors influencing physical durability

Neglecting "replaceable" parts that can readily (and in some cases routinely) be replaced by the consumers themselves, the parts that appear to be critical in determining physical durability are the brushes for a motor-driven appliance and the contact elements for a thermostatically controlled appliance.

The minimum life for which products are designed varies for different products. It appears that vacuum cleaners are typically designed to last for a minimum of 500 hours (the responses actually varied from 400 - 800 hours); however, owing to differing usage rates, etc., it is difficult to convert to a lifetime in years -- 37 hours of use per year is commonly thought to be the average, but tests by one manufacturer have suggested that annual use is typically closer to 25 hours. On this latter assumption, 500 hours corresponds to

20 years. However, another manufacturer designs for a 10 year lifetime based on an average usage rate of 40 - 50 hours per year. Different manufacturers quoted 3, 5, 8, and 10 years minimum lifetime for small personal care and kitchan appliances; in one case, it was suggested that a product costing less than $15 should last for 5 years, while a product costing more than $15 should last for 10 years.

There was general agreement that the products could be designed to last longer; however, certain problems (not simply cost considerations) were pointed out. One was that, for motor-driven appliances, an increase in the longevity of the brushes would mean an increase in their size, which would also mean an increase in the size of all other parts of the motor. More power would be needed to drive such a motor. Another problem was related to the achievement of scale economies in the manufacture of components; as long as most manufacturers are using the same shorter-lived component, it can be prohibitively expensive to obtain a longer-lived one.

For some manufacturers, there is no difference in durability as one goes from the bottom to the top of a particular product line (the main difference is in the gadgets, attachments, etc.); for other manufacturers, there is a difference in durability (for example, the top-of-the-line product may have a governor-controlled motor, which is likely to last longer).

Some manufacturers claimed definite improvements in durability achieved during the past ten years or so, due to technical innovation. For example, the introduction of improved safety cords on irons, as well as the self-cleaning feature, has caused them to last longer. One company suggested (although others did not necessarily agree) that while irons, toasters, and vacuum cleaners have generally been made more durable, other products such as can openers, blenders, mixers, and some skillets, have increasingly been made with inferior motors and/or thinner metal as the result of fierce price competition.

3.4.2 How durable should a product be?

On the question of how long a product should be designed to last, it was commonly stated that the answer is "as long as possible within the constraint of a 'reasonable' price", the latter being based on marketing considerations. In other words, given the price at which the product is to sell (which is decided by consumer willingness to pay), the designers will incorporate the greatest possible durability obtainable for this price. It was commented that most consumers would not want products lasting longer than about ten years

(and for some products, less than this); Americans are too "change-oriented" and would dispose of the products within this time even if they were still working. The claim was made that if consumers wanted more durable products, this would show up in marketing studies and would also be reflected in the loss of market share to a manufacturer offering a more durable alternative. "Test runs" with more durable products have apparently been unsuccessful. It may be noted that a more durable (lifetime) blender is currently being offered, but it is a little early to judge the sales. The useful lifetimes of some products are tied to external factors; for example, it was claimed by one manufacturer that vacuum cleaners should last for ten years since this is the length of time between changes in floor coverings (another manufacturer, on the other hand, designs vacuum cleaners to "last a lifetime").

Hairdryers represent another product whose useful life was claimed to depend on outside factors -- changing hairstyles. Since the latter change very frequently, it was claimed that hairdryers need not last more than a few years. Cyclical changes in fabrics/fashions also have implications for the durability of irons.

3.4.3 Warranties

Some of the manufacturers offer a full one-year warranty,* with all parts and labor included, while others offer only a partial warranty for the same period, with certain parts (e.g., those that can be easily abused) excluded. One of the manufacturers surveyed offers a two-year warranty. Most said that their warranties are intended to catch malfunctions due to inadequate design or manufacture, and that most of these would be expected to happen within the first year; nevertheless, in many cases the warranties would be honored for several months beyond their specified cut-off dates.

3.5 Factors Influencing Repairability

3.5.1 Repair versus replacement

Some of those interviewed pointed out that it may not always be in a consumer's best interest to have a product repaired rather than buying a replacement. For example, if a vacuum cleaner motor is re-built, it will probably outlast all of the other parts. However, by the time that re-building is necessary

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*As defined in the Magnuson-Moss Warranty -- Federal Trade Commission Improvement Act, Public Law 93-631.

(around ten years) there are likely to be new products on the market that are not only significantly better (it was claimed) in terms of performance, durability, energy consumption, etc., but also available at a price close to that of repair. This is partially due to the fact that repair is typically very labor-intensive, so that the economies of scale associated with the manufacturing process are not possible.

The small appliance manufacturers generally felt that the retail system discourages repair, at least during the warranty period, as retail outlets usually offer over-the-counter exchanges on products that malfunction while under warranty. Customers have come to expect this and insist that a $20 blender work perfectly, demanding a replacement if it does not; yet, it was suggested, they would never consider demanding that an automobile be replaced under similar circumstances.

3.5.2 Company efforts to encourage repair

3.5.2.1 Design

All of the companies interviewed explicitly consider repairability during the product design process. The ultimate goal is to design products that will never malfunction, but since some always do, ease of repair is a design objective. Most of the manufacturers have a formal system for reviewing work performed at authorized repair stations in order to spot possible design problems.

One of the manufacturers commented that small appliances assembled outside the United States (e.g., in Korea or Hong Kong) have not always been of adequate quality; for example, they have sometimes been difficult to repair. However, this manufacturer claimed that the situation has been improving in the past few years.

A vacuum cleaner manufacturer has designed its recent models so that the bags will be easy for the consumers to change, since failure to change bags often leads to motor strain and eventually to the need for repair. The molding or stamping of special warnings on the body of products was generally thought to be impractical on the grounds that consumers would ignore them and the products' attractiveness would be hampered. (Safety warnings are already on many products.) When one vacuum cleaner manufacturer considered adding a warning light that would indicate when the hose was clogged, resistance was encountered from the retail trade which viewed the promotion of such a feature to be "negative selling".

3.5.2.2 Use and care guides

A great deal of repair was thought to be necessitated by consumer abuse, such as the use of tap water in irons requiring distilled water, the vacuuming of pine needles, and so forth. As well as encouraging proper maintenance, most of the use and care guides published by those interviewed contain some warnings about the most common misuses or abuses by consumers that led to the product's malfunctioning. One manufacturer even puts a fact tag inside its vacuum cleaners which is visible when the bag is changed.

All of the manufacturers were concerned that the use and care guides are not read by consumers. One marketing executive commented that since consumers are somewhat familiar with most small applicance, they have a tendency to "plug it in and go" without ever reading the booklet. Some of the manufacturers are working on ways to increase the probability that the books will be read, such as writing prominently on the front cover "To get full value from this appliance, PLEASE READ!," or packing the booklet in such a manner that it cannot be overlooked (e.g., inside a blender jar).

3.5.2.3 Parts support

Maintaining the availability of spare parts affects repairability. All manufacturers claimed to stock parts for at least seven years from the date of last manufacture and some, for fifteen years.* Manufacturers of the more expensive products appeared more inclined to try to make a necessary but discontinued part or to modify an existing part if required.**

3.5.3 Self-repair by consumers

A few of the manufacturers said that they encourage some minor repair by consumers (e.g., changing the belts or rollers in vacuum cleaners); one appliance manufacturer even conducts training sessions for consumers at its warranty stations. However, most of the manufacturers discourage self-repair by consumers. It was pointed out that most consumers lack the training to work with electrical apparatus, and that a consumer rarely has access to the equipment necessary to test a product once it has been reassembled. The trend in the courts is toward stricter and stricter liability and manufacturers have been successfully sued by consumers injured while attempting to repair products.

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*It was stated that, if demand continued, parts would be maintained even longer.

**Perhaps such requests are made less often with respect to the less expensive products.

One manufacturer makes it impossible for anyone other than a professional repair person to get inside the motor of its appliances.

3.5.4 Service networks

The manufacturers and retailers consulted on this project have a variety of systems for authorized repair of their products; some own all of the outlets, while others own none.

Most plans include systematic training of the repair personnel. One of the leading small appliance manufacturers conducts familiarization programs for each new product introduced and then follows-up after three, twelve, and twenty-four months to ensure that critical personnel remain familiar with their products.

Several of the manufacturers regularly send engineers to the repair facilities to check on the shop's attitude, operations, and technical competence. Based on these reviews, monitoring of repair charges, and consumer satisfaction, a particular repair station may or may not be allowed to keep its franchise.

Some companies require a considerable amount of information from repair outlets before the latter are paid for warranty work; at a minimum, the name and address of the consumer, a description of the problem, and an account of the action taken are needed. A proportion of the consumers are then contacted by the producer to assure that the work was actually performed and that the consumer is satisfied.

All of those interviewed recognized the wealth of information that is available through the repair network -- e.g., consumer problems, keys to manufacturing or design problems, and so forth -- and systematically take advantage of this information.

Most of the manufacturers have similar methods for dealing with unauthorized repair outlets, although they vary in their degree of concern. Typically, the company's legal staff reviews Yellow Pages from across the nation, looking for repair shops which are not authorized but advertise in a manner that implies they are. One company will sue anyone that inappropriately uses its logo. Unauthorized shops are not much of a problem if the service involved is warranty service since an unauthorized shop simply would not be paid by the manufacturer; therefore, there is not much incentive for misrepresentation with respect to warranty service.

None of the manufacturers interviewed automatically pay the postage if a product is shipped to a repair outlet under warranty,* although they do pay the return postage. They argued that paying the postage both ways would only increase the price of the product -- and this increased cost would be borne equally by all purchasers of the product.

3.6 The Operation of Second-Hand Markets

Few of the manufacturers interviewed either involve themselves in second-hand markets (e.g., trade-in programs, re-building of products, etc.) or feel that their operations are affected or threatened by second-hand markets. Several felt that trade-in programs are simply sales gimmicks to encourage brand switching; the money paid for a trade-in could be given as a straight discount, and the traded-in appliance is discarded anyway. Of the products considered in this study, vacuum cleaners are probably the most often re-built; one company representative estimated the market for re-builts at more than one million vacuum cleaners per year. Although many of the companies themselves do not re-build their appliances, they recognize that their service centers often do offer re-built products. One manufacturer, however, offers a contract for a purchaser to have his product re-built as often as necessary (normally when the brushes go) during his lifetime; the contract currently costs $45. Some companies stated that it is cheaper to make a new product than to re-build an old one (largely because of the labor involved in the latter); one suggested, too, that it may be difficult for customers to know what they are getting in a re-built appliance; some parts may have been used two or three times before.

A small number of companies do re-build their own products, especially those that are returned during the warranty period and replaced over the counter. The key to a successful re-building program is the availability of a distribution system. Manufacturer-owned or authorized service centers provide such a system. Products are typically restored, repackaged, and sold with full warranty; however, they carry a permanent label indicating that they have been re-built. Despite precautions, there does exist the possibility that this label may be removed and the product sold as new. According to one manufacturer, the margin for the manufacturer is slightly better on a new than a re-built appliance; the retailer typically marks up 50 percent, thus the new

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*One will do so on request.

product gives higher profit per unit in absolute terms (although the re-built, being cheaper, may be easier to sell).

3.7 Consumer Behavior in Product Acquisition and Disposal

3.7.1 Product acquisition

Factors thought (by the companies interviewed) to influence the purchase of a product included the product's appearance, cost, reputation of the manufacturer, performance, and durability. One company drew attention to the importance of visual appeal in the competitive and predominantly self-service market for small electrical appliances. Although all of those interviewed stressed the need to provide consumers with what they want, none were prepared to discuss in detail how these wants are determined.

There was some mixed reaction to the issue of whether consumers are encouraged to buy products that they do not need, although most representatives felt that their companies are not guilty of such a practice. It was pointed out that many products that may not really be needed are purchased as gifts.

3.7.2 Product disposal

The vacuum cleaner manufacturers have data indicating that very few vacuum cleaners are thrown away; instead, most are apparently handed down, stored, or used in another location. Some are traded-in, though usually not to the manufacturers themselves (since most of those interviewed do not have trade-in programs), but rather to their authorized service centers or other independent stores that do accept trade-ins. One executive expressed the opinion that trade-in programs only encourage brand switching; many of the products taken in may be subsequently discarded. On the other hand, it is known that a significant market does exist for re-built vacuum cleaners.

Storage was thought to be the most often used disposal method for other small electrical appliances, although some may be used for secondary purposes (e.g., hairdryers used to dry paint). Broken products that are not repaired were thought be be thrown away.

None of the companies interviewed felt that they influenced the consumer's disposal choice, other than through their efforts to encourage repair.

3.7.3 Consumer education

While most of the company representatives felt that consumers are able to make reasonable price/quality trade-offs, there was some concern that

consumer education programs are in order, both to make more information available and to ensure that the information is used.

This area, however, is fraught with difficulties. The case in the vacuum cleaner industry provides a good example. At present many consumers interpret horsepower ratings as a measure of performance capability but more horsepower is not necessarily (nor infinitely) better. Air movement is much more critical in determining how well a vacuum cleaner cleans. The difficulties of explaining the concept of air movement and of attempting to overcome the consumers' traditional assessment of horsepower have led vacuum cleaner manufacturers to ignore this area in the past. They all commented that the problem would be best addressed at the industry level, as it may not be in the interest of an individual manufacturer to promote air movement as long as consumers "think horsepower".

Nevertheless, literature explaining air movement as it applies to above-the-floor cleaning is being issued by one retailer, and the Vacuum Cleaner Manufacturers Association (VCMA) is working through the American Society for Testing and Materials to develop vacuum cleaner test methods and standards not only for cleaning power but also for durability and other attributes so that consumers can make realistic comparisons among brands.*

The small appliance manufacturers were also concerned with information dissemination but no industry-level activity was reported. They attributed part of the problem to relatively uninformed retail sales personnel and a self-service environment for the sale of most small appliances. One company tries to put as much information as possible on their box, another is considering the use of video tapes in its retail displays, and another stresses relevant information in its advertisements.

The companies regard the use and care guides as important sources of information regarding safety and maintenance and are distressed that more people do not read them (see section 3.5.2 above).** The guides are updated regularly to add warnings, expand explanations, clear up statements that are found to be ambiguous, and so forth, mostly in response to consumer contacts and information from the repair network. (The regularity of these revisions varies with the companies.)

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*See also section 5.2.1.1.

**One company considered putting important information on a record.

3.8 Comments on Policies Designed to Increase Product Lifetimes

Companies were asked for their reactions to a number of policy options, but only five of those interviewed were willing to respond. Their comments, many of which have been incorporated into the discussion on policy options in section 5 (below), are summarized in appendix F.

3.9 Summary

The following are some of the key points made by manufacturers of small appliances and vacuum cleaners:

(i) The industries are highly competitive, with the markets for many products at or near saturation. Continuous innovation was seen as essential to maintain market share and profitability.

(ii) The companies all claimed to respond to consumer needs. They suggested that "change" is a way of life for most Americans, although they conceded that industries do play a significant role in fostering this change.

(iii) Those interviewed rejected the suggestion that they might indulge in "product obsolescence" (that is, the introduction of needless innovations to promote consumer dissatisfaction with existing products). They argued that stylistic changes almost invariably accompany technological changes since the former are too expensive to introduce by themselves; however, since most of their products are bought "off-the-shelf", appearance is important in attracting customers already in the market.

(iv) It was agreed that products could be built to last longer; however, this would not only increase costs but might also impair other characteristics of the products. It was claimed that products are typically made as durable as possible, within price constraints based on marketing considerations.

(v) According to those interviewed, efforts are made to minimize the need for maintenance and repair of their products, although this need cannot be eliminated completely. Improvements are constantly being made to use and care instructions, although it was feared that too much attention given to problem avoidance would constitute "negative selling". Repairs by qualified personnel (as necessary) are encouraged and technically present no problems, but home repairs are deliberately discouraged, owing to safety and potential liability considerations. Although products are discontinued when demand falls, the manufacturers maintain spare parts for several years thereafter and the availability of parts was not thought to be a constraint on repair. However, it was pointed out that repair may not always be in a consumer's best interest, since it may be possible to purchase a later model of the same product at little or no additional cost; this is because mass production techniques can be used in the manufacture of new products while they are typically not applicable to repair (the latter being labor-intensive).

(vi) Most of the manufacturers have little or no involvement in second-hand markets for their products. Many viewed trade-in programs as marketing devices, pointing out that the traded-in products are typically discarded. Some manufacturers have re-building programs, but these are commonly limited to products that have been rejected during the manufacturing process or returned under warranty with minor flaws. There is, however, a significant market for re-built vacuum cleaners.*

*There may also be a significant re-built market for televisions. However, television manufacturers were not interviewed in this part of the study.

SECTION 4
INVESTIGATION OF SECOND-HAND MARKETS

4.1 Introduction

This section reports on the research team's investigation of "formal" second-hand markets, i.e., structured channels for the transfer of used products (not including casual transfers between friends or relatives). The purpose of the investigation was to obtain direct evidence on the operation and significance of these markets as a means of transferring products from owners who no longer use them to prospective new users who may thereby extend their lifetimes.*

It was beyond the scope of this study to undertake a large-scale, systematic examination of second-hand markets; rather, the limited resources available were used:

- to identify the market channels,
- to gain a reasonably reliable impression of the volume of small electrical appliances handled, and
- to understand the principal factors and constraints affecting the workings of the markets.

The research included interviews with market participants and other interested parties (e.g., the State Board of Equalization), field observation, and reviews of printed advertisements, tax records, and other pertinent documents.

4.2 Findings

A review of the local Yellow Pages, various shoppers' guides, articles in newspapers and magazines, etc., suggested that someone who wishes to sell, donate, or purchase a used small electrical appliance in the Santa Monica area has the choice of several different second-hand markets in which to participate, as listed in table 4.2.1.

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*A rare example of earlier research on the topic of second-hand markets was a study on the acquisition and disposal of used consumer durable goods by households in Cedar Rapids, Iowa (Roussos and Konopa, 1977). However, the study which took the form of a household survey, did not look directly at the markets discussed in this section.

TABLE 4.2.1
SECOND-HAND MARKETS FOR SMALL ELECTRICAL APPLIANCES
(Serving City of Santa Monica)

Garage sales
Swap meets
Classified advertisements
Bulletin boards
Thrift stores (i) privately operated
(ii) charitably operated
Retail stores accepting trade-ins/offering re-builts

Mention of trade-in and re-building programs has already been made in section 3 above. It appears that trade-in or "exchange" programs for the bulk of small appliances, which are typically offered by service centers or smaller stores (rather than the larger stores or discount houses) frequently provide a reason for giving a discount on the sale of a new or re-built product but generally do not lead to re-use of the old product; instead, this is simply thrown away. The products that are sold as re-built are usually those that have been rejected during manufacture or returned under warranty with very minor flaws. Only for vacuum cleaners (and possibly televisions) do trading-in and re-building appear to play a significant role in extending the life-times of older, used products.

The remainder of this section will focus on the other second-hand markets listed in table 4.2.1, in which a greater variety of used small appliances are typically bought and sold.

4.2.1 Garage sales

Garage sales, yard sales, apartment sales, alley sales, etc., are all basically the same type of market; they differ only according to their location. Visual surveys conducted throughout Santa Monica on six weekends spread over three different months (February, April, and June) suggested that a dozen or more garage sales may be held citywide on a given weekend (they are rarely held at other times in the week).* They typically last from one to three days, and include merchandise from a single household or from several households selling together. For any given household a garage sale is generally an

*It is normal practice to advertise garage sales in the local newspaper and/or using signs that are visible from the nearest major street(s). Sales were, therefore, identified from the newspaper and by systematically travelling all of the major streets in the city. While some poorly advertised sales might have been missed using this procedure, it seemed to be the only feasible approach, given the resources available.

occasional (i.e., probably less than once per year) event; however, some garage sales are held regularly, often with merchandise acquired from other garage sales, swap meets, etc.

In each of the garage sales surveyed, there were an average of less than one half-dozen small electrical appliances (mostly radios, can openers, toasters, hairdryers, and coffee-makers) among larger quantities of books, clothes, kitchen utensils, and sometimes furniture. The appliances were invariably sold "as is", although it was occasionally possible to test them prior to purchase. Strictly, the operator of a garage sale is supposed to obtain a sales permit and to pay state sales tax on all items sold, but in practice enforcement is lax; although the permit should be conspicuously displayed, none were seen during the surveys. It was learned that the tax authorities are occasionally informed about garage sales (e.g., by anonymous neighbors) and are then forced to investigate; however, in these cases the costs of collection typically exceed the revenues collected.

4.2.2 Swap meets

Typically taking place in large parking lots, open-air theaters, stadiums, or exhibition centers, swap meets provide the opportunity for large numbers of buyers and sellers of used (and sometimes new) merchandise to come together. There are currently no swap meets held in Santa Monica itself, but nine were identified within 45 to 60 minutes' driving distance of the city.* One of these operates daily; the others are open for one, two, or three days of the week. For the purpose of the study, five of the identified swap meets were visited by members of the research team.**

The operator of a swap meet generally requires a permit from the appropriate local government and must abide by any conditions included in local ordinances. Typically these vary from specifications of permissable timing to the necessary public services (such as parking spaces, toilets, first-aid centers, security arrangements to discourage the sale of stolen goods, etc.) that must be provided.*** A person wishing to sell merchandise pays for a space (usually

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*Details given in appendix G.

**Those selected at random for site visits were the Long Beach, Paramount, San Fernando, Stadium, and Starlite Swap Meets. A rather consistent picture of the way in which small electrical appliances are handled emerged from each of these visits; thus it was not felt necessary (for the purpose of the study) to make further visits to the remaining sites.

***Teel, R., San Fernando Swap Meet, Personal Communication, June, 1977.

between $7 to $10 per day) and is supposed to pay state sales tax on all items sold.* For collection purposes, the sellers are divided into "permanent" and "occasional" categories, the distinguishing feature being whether sales are made at swap meets more or less than eight times in six consecutive months. The permanent sellers are required to have sales permits from the State Board of Equalization, and they are supposed to mail the tax (currently 6 percent of total sales) to the board quarterly. The occasional sellers, on the other hand, are supposed to pay at the end of each day, either by direct mailing or by deposit (with an appropriate form) into collection boxes provided by the board for this purpose at swap meet exits. In practice it appeared (from observation and communication with those involved) that the tax is rarely collected.

In an attempt to check the sale of stolen products at swap meets, the state requires organizers to ask all sellers to fill out a "merchandise control sheet" with specific information including the name of the seller (backed by personal and two additional forms of identification), the list of articles offered for sale, the manufacturers' names, the models, and serial numbers.** It is usual for one copy of the form to be sent to the police department, another to the local chamber of commerce, and the third to be retained by the organizer. In practice, as with tax collection, the degree to which the correct procedures are followed is far from complete. Enforcement is difficult; most transactions are by cash (without receipts), although a small number of sellers accept the major credit cards.

Although swap meets appeared to be among the more significant (of the various markets surveyed) for the sale of small electrical appliances, the observed volume of these products was still relatively small compared to that of other merchandise on display (see table 4.2.2). The latter typically included a wide variety of products, such as clothing, auto parts, furniture, and stereo equipment, some of which were new (especially at weekend meets); the new products were generally manufacturers' rejects, obsolete models, insurance company acquisitions, etc., or in some cases they were offered as part of a sales promotion. The used small electrical appliances, among which irons and toasters were the most prevalent (with coffee makers also in much evidence)

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*California State Board of Equalization, Department of Business Tax, Requirement BT-410 REV 7(10-74).

**California Business and Professions Code, Section 21628.

were frequently in poor condition; about two-thirds of those seen in the survey were incomplete or in need of attention. Of the remaining third, claimed to be in working condition, only some could be tested prior to purchase, and no warranties were given. However, some permanent sellers said that they would be prepared to exchange an appliance found to be faulty.

TABLE 4.2.2
VOLUME OF SMALL ELECTRICAL APPLIANCES OBSERVED AT SWAP MEETS*

Appliance	Long Beach	Paramount	San Fernando	Starlite Swap Meet	Stadium Swap Meet
Toaster & Toaster Oven	9	18	20	13	28
Elec. Mixer	0	3	5	2	4
Elec. Can Opener	5	16	7	5	10
Blender	1	3	13	7	8
Frying Pan	1	4	6	2	5
Hairdryer (hand held)	5	9	6	6	9
Coffee Maker	7	19	23	5	25
Hairdryer (Bonnet type)	0	3	2	7	5
Elec. Toothbrush	0	0	2	0	2
Television (B&W)	3	12	4	2	28
Radio	1	3	0	14	16
Vacuum Cleaner	3	10	11	1	21
Iron	2	16	33	29	47

It was determined that the sellers typically obtain their used products from their own or neighbors' attics (or equivalent storage areas), from other sellers at swap meets, from garage sales, and from thrift stores. In some cases they may clean or perform minor repairs on the products. It appears that they are generally successful at selling their merchandise, though not

*Based on single day visits to each location.

always on the first day. Buyers, who have usually paid 35¢ to 50¢ per person for admittance to the swap meet, generally expect to bargain over the prices charged. The latter may be reduced considerably for products that have not sold after a week, and occasionally a "box-full" of used appliances may be offered at a particularly low all-in price.

Swap meets have grown considerably in popularity in the past ten years; for example, the issuance of sales permits by the State Board of Equalization has nearly quadrupuled in this time.* A swap meet of moderate size today attracts some 350 to 500 sellers on a weekday and 750 to 1,000 sellers on a weekend, while parking for 1,300 buyers' cars is barely sufficient at the busiest times.

4.2.3 Classified advertisements

Private sales of small electrical appliances in the Santa Monica area are facilitated by the availability of a special "Bargain Box" classification in the local newspaper, the Santa Monica Evening Outlook. For $1, a private individual may advertise a single product priced less than $100; the copy may contain up to 40 letters (including spaces), no abbreviations are allowed, the word "new" must not be used, and the advertisement runs for two days following its receipt. The Outlook itself has an estimated daily (Sunday excluded) circulation of 39,175;** however, the Wednesday advertisements are automatically reproduced in nine additional local newspapers that are freely distributed on Thursdays throughout an extensive area surrounding Santa Monica, giving an estimated circulation of 200,000.***

For the purpose of the study, the Bargain Box columns were surveyed every other day over two one-month periods in 1977. A check of the listed telephone numbers indicated that this procedure resulted in little or no double-counting of products. The findings were similar in each of the months (see table 4.2.3): in total, about 80 small electrical appliances were advertised per month, making them much less common than items of furniture (over 1,300), cars and car parts (over 230), stereo equipment (over 210), bicycles (over 150), and many other products. In some cases (especially for furniture) the figures obtained were underestimates of the number of individual items being offered

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*Stein, L. H., California State Board of Equalization, Personal Communication, June, 1977.

**Thoinber, C., Santa Monica Evening Outlook, Personal Communication, September, 1977.

***Ibid.

for sale since several (e.g., a set of bar stools) were listed in a single advertisement.

TABLE 4.2.3
VOLUME OF SMALL ELECTRICAL APPLIANCES OFFERED FOR SALE VIA "BARGAIN BOX" IN THE SANTA MONICA EVENING OUTLOOK

Product	Feb. 15, 1977 - March 15, 1977	July 1, 1977 - Aug. 1, 1977
Vacuum Cleaner	34	41
Hairdryer (Hand held & Bonnet type)	18	7
Radio	10	17
Iron	1	5
Blender	4	13
Coffee Maker	2	2
Toaster	5	4
Television (B&W)	65	74

It was not possible in this particular study to find out how many of the products advertised were actually sold, and at what final price, but some random telephone calls suggested that around one-half of the products had been sold within three weeks after the appropriate advertisement had appeared. An interesting finding was that some sellers, particularly of televisions, offered the caller alternative products at different prices; this suggested that commercial businesses were improperly using the Bargain Box columns.

4.2.4 Bulletin boards

The research team sought advertisements for small electrical appliances on bulletin boards in supermarkets, laundromats, etc., but the number found was too few to warrant further consideration.

4.2.5 Thrift stores

For the purpose of the study, thrift stores were categorized as being either privately or charitably operated.

4.2.5.1 Privately operated thrift stores

Four stores of this kind were identified in Santa Monica.* From interviews with the operators of all four of these stores, it appeared that they generally obtain their merchandise from households that are moving, or at garage sales and auctions. They are usually willing to buy a used appliance in working order, but they hesitate if it is in need of repair (since in most cases they consider it uneconomical for them to have the repairs carried out). The appliance, once purchased, is subsequently offered for sale "as is" without a warranty; in some stores (typically those with the lowest prices), prospective customers are not even able to test an appliance prior to purchase. Sales tax is collected. Overall, the study suggested that small electrical appliances are generally a small volume item in privately operated thrift stores, amounting to just one or two in each store at any given time (see table 4.2.4); more commonly found are clothes, books, and kitchen utensils, etc.

TABLE 4.2.4

VOLUME OF SMALL ELECTRICAL APPLIANCES
OBSERVED IN PRIVATELY OPERATED THRIFT STORES**

Appliance	Bargain Bazaar	Carih Gift & Thrift Shop	Cottage Thrift Shop	Sunlight Thrift Shop
Toaster	2	0	1	0
Elec. Can Opener	1	0	0	1
Blender	1	0	0	0
Elec. Frying Pan	0	1	0	0
Toaster Oven	0	1	0	1
Iron	0	0	2	0

4.2.5.2 Charitably operated thrift stores

The study identified seven thrift stores in Santa Monica operated by charitable organizations.*** It was determined that the donation of a used

*Details given in appendix H.

**Based on single visits to each store.

***Details given in appendix H.

appliance to any one of these organizations entitles the donor to a tax deduction; although a receipt is generally given for the gift, it is invariably left to the donor to assess its value for tax purposes (and it is apparently rare that the Internal Revenue Service checks up on these assessments).

The organizations differ in that some operate thrift stores primarily as a means of raising money to finance other charitable activities (e.g., the City of Hope Hospital), whereas others use the process of operating the the second-hand market itself to fulfill a charitable function. For example, Goodwill Industries are primarily concerned with the training of previously "unemployable" persons so that they can subsequently take up productive occupations. The cleaning up and/or repair of used products are, therefore, an important feature of Goodwill's activities. However, even at Goodwill, more than half of the small electrical appliances received cannot be rendered suitable for sale in a thrift store owing to their age, poor condition, etc.; instead they may be auctioned or otherwise sold "as is" to any willing buyer (often ending up south of the U.S. border) or else they are junked. Appliances in better condition receive the necessary treatment and are distributed for sale in various Goodwill stores, where they are normally a minor line relative to clothing and furniture (see table 4.2.5).*

TABLE 4.2.5
SHIPMENTS OF SMALL ELECTRICAL APPLIANCES
TO GOODWILL INDUSTRIES, LOS ANGELES STORE, 1976

Appliance	Total number shipped to West LA store**
Can opener	28
Coffee pot	37
Hairdryer (hand-held and bonnet)	38
Heater	10
Iron	51
Toaster	44
Television (B&W)	31
Vacuum cleaner	37

*Beebe, R and LeBreton, C., Goodwill Industries of Southern California, Personal Communications, February, 1977.

**Based on merchandise order and invoice forms, Goodwill Industries. By analyzing the ratio of total sales to total shipments for each month of 1976, it was found that of total shipments, approximately 47% are typically sold.

The Salvation Army is somewhat similar to Goodwill in that emphasis is placed on employing disadvantaged people (in this case mostly alcoholics, drug addicts, etc.) to run the operation. However, other than cleaning and minor repairs, the Salvation Army does not normally undertake more extensive repair work; instead, where this appears to be worthwhile, it is contracted for with a private firm. Again, small electrical appliances represent a small segment of the goods handled; clothes, furniture, and books, etc., are more common.*

Sales made by Goodwill and Salvation Army are exempt from the State sales tax on the grounds that they both qualify for the "welfare exemption" from propert taxation, i.e., they are both organizations that use their property in actual operation of a charitable activity, rather than using it simply to raise funds. Other charitably operated thrift stores such as those run by various religious groups (St. Vincent de Paul, St. Augustine's, Beverly Hills Hadassah, etc.) do not qualify under this provision and are supposed to collect sales tax on all items sold (although the donors still qualify for a tax deduction for their gifts). In most cases, these shops obtain their merchandise mainly from members of their own religious groups. Small electrical appliances again do not figure highly in their sales (see table 4.2.6), partly because many of those donated are in need of repair; the organizations have no repair facilities themselves, and they do not find it economical to have the appliances repaired privately. When an appliance is offered for sale at one of the thrift shops, no warranty is given, but in most cases the product can be tried out prior to purchase.

4.3 General Observations

4.3.1 Prices and quality

An impression of the prices charged for used small electrical appliances can be gained from table 4.3.1, which lists the ranges observed for the different markets. However, the reader should be cautioned against placing too much confidence on the individual figures quoted, since some are based on small samples (occasionally just a single product) and others are skewed owing to the inclusion of one or more unusually expensive (or inexpensive) items. Nevertheless, the figures overall convey a finding that seems to be consistent with the research team's general impression, namely that the appliances offered in Bargain Box carry the highest prices, while those offered at swap meets

*Morris, C., Salvation Army, Personal Communication, July, 1977.

carry the lowest prices. Garage sale prices, although not included in the table, were observed to be generally similar to those at swap meets.

TABLE 4.2.6
VOLUME OF SMALL ELECTRICAL APPLIANCES
OBSERVED IN CHARITABLY OPERATED THRIFT STORES*
(Excluding Goodwill and Salvation Army Stores)

Appliance	St. Augustine's Thrift Shop	Beverly Hills Hadassah	St. Matthew's Thrift Shop	St. Vincent de Paul Society of LA
Can opener	1	3	2	0
Coffee maker	2	0	0	0
Frying pan	2	0	0	0
Hairdryer (hand-held)	2	0	1	0
Radio	2	0	0	0
Toaster	0	1	1	0
Toaster oven	0	1	0	2
Iron	0	2	2	0
Elec. frying pan	0	1	0	0
Television (B&W)	0	0	0	7
Vacuum cleaner	0	0	0	3

This finding is not unreasonable when viewed in light of the transaction costs involved. Advertising in Bargain Box, at $1 per item (plus the costs of a check and postage if the advertisement is mailed in) is relatively expensive; furthermore the seller faces the inconvenience of telephone calls and visits by prospective buyers. The procedure is probably not worthwhile unless the appliance being offered is in reasonably good condition and is likely to sell for more than just a few dollars. At the other end of the scale, garage sales and swap meets are viewed by many people as providing a relatively inexpensive and rather enjoyable means of selling off a variety of items for which they no longer have any use. For some, the proceeds are almost irrelevant. Of course, this is not the case for the "permanent" sellers, but these too face comparatively low overheads and must cater to buyers who are generally in the market only for what they perceive as "bargains".

*Based on single visits to each store.

TABLE 4.3.1
PRICE RANGES FOR SMALL ELECTRICAL APPLIANCES
OBSERVED IN VARIOUS SECOND-HAND MARKETS (Dollars)

Market / Appliance	Swap Meet	Bargain Box	Thrift Store: Privately Operated	Thrift Store: Charitably Operated (fund-raising)	Charitably Operated (Goodwill Industries)
Vacuum Cleaner	5.00-25.00	7.00-75.00	n.o.	25.00-35.00	12.74-27.49
Hairdryer	2.00- 7.00	5.00-75.00	n.o.	3.50- 5.00	3.45- 7.99
Toaster	0.75- 4.00	5.00-50.00	7.50	3.50- 3.99	3.99- 7.99
Toaster Oven	n.o.	n.o.	14.99	8.99-12.50	n.o.
Iron	0.50- 4.50	7.00-50.00	n.o.	3.99- 6.50	2.81- 4.99
Blender	2.50- 9.00	8.00-20.00	8.00	n.o.	n.o.
Coffee Maker	1.50- 4.50	9.00-20.00	n.o.	7.50	2.39- 7.99
Radio	3.00-12.00	8.00-75.00	n.o.	7.50-10.00	n.o.
Mixer	2.00- 5.50	n.o.	n.o.	n.o.	n.o.
Can Opener	1.50- 3.50	n.o.	5.10-5.99	2.99- 4.50	2.14- 4.65
Elec. Frying Pan	1.00- 5.00	n.o.	8.99	10.00-10.50	n.o.

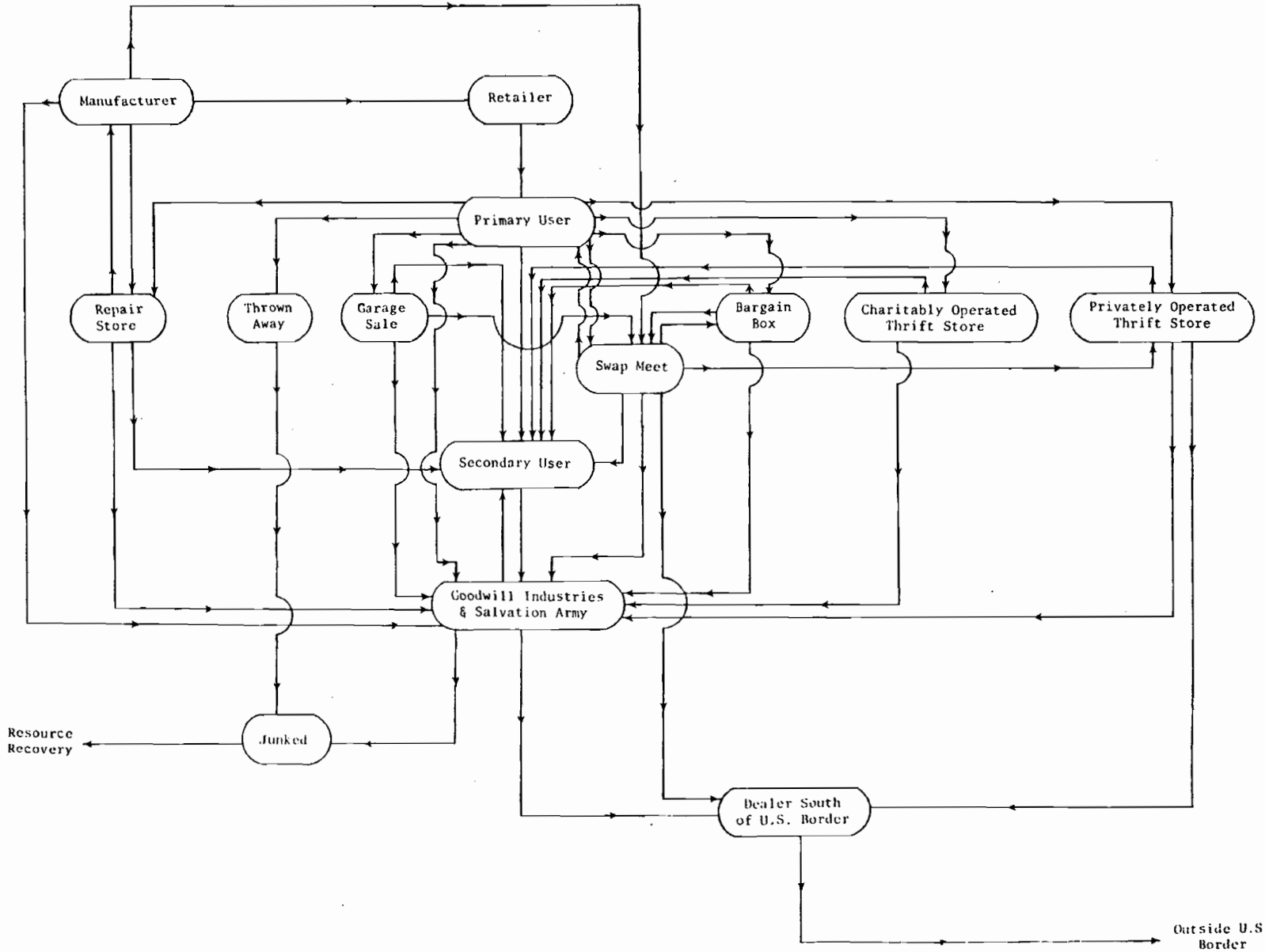
n.o. = none observed

The prices charged by thrift stores show a fairly wide variance. Those that are privately operated tend to charge more than those operated by charitable organizations, but the quality of the merchandise generally seems to be better. This might be expected since the stores have greater control over their inventories. The charitably operated stores, on the other hand, can accept only what is donated to them. Some (e.g., the Beverly Hills Hadassah) seem to be fortunate in obtaining products of above-average quality that can be sold at high prices. Others (e.g., St. Vincent de Paul) charge much less for their goods. Goodwill Industries and the Salvation Army, in operating as charitable activities rather than fund-raisers, benefit both from tax advantages and also government subsidies; their prices are often (though not always) correspondingly low.

4.3.2 Inter-relationships between markets

An interesting finding of the study was that all of the second-hand markets appear to be inter-related, as indicated in figure 4.3.1. It seems that

FIGURE 4.3.1
INTER-RELATIONSHIPS AMONG SECOND-HAND MARKETS



used goods frequently pass through more than one market before they reach a secondary user or are junked; furthermore, although this is not shown in the figure (to avoid additional complexity), the secondary user may subsequently pass the product on to yet another market when it is no longer wanted. As mentioned earlier in this paper, it is not uncommon for a seller in one market (e.g., a swap meet) to obtain merchandise from other sellers in the same or another market (e.g., a garage sale). Furthermore, merchandise that fails to sell elsewhere is frequently "dumped" on Goodwill Industries or the Salvation Army in return for a tax deduction. Not surprisingly, the recipient charities do not like to be treated in this way as the "last resort"; they point out that merchandise that has already proven itself difficult to sell elsewhere is generally of little or no value to them.

The increase in the popularity of garage sales and swap meets that has occurred over the past few years is considered to be a major factor contributing to a decline in the quantity and quality of merchandise received by the two major charitable organizations. On the other hand, it should be recognized that for certain people (particularly those in high tax brackets), donating used products to charity can be financially more advantageous (and more convenient) than attempting to sell them directly in a second-hand market; this is because they may succeed in assessing the products at a much higher value for tax purposes than they would be likely to earn by selling them.

4.4 Summary

Some of the key findings of the investigation of second-hand markets are as follows:

(i) Second-hand markets for small electrical appliances in the Santa Monica area include garage sales, swap meets, classified advertisements, thrift stores (privately and charitably operated), and retail stores accepting trade-ins and/or offering re-builts.

(ii) The volume of used small electrical appliances passing through these channels is relatively small, numbering in the tens or hundreds per month, compared with the thousands of new appliances sold monthly in the same city.*

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*According to the 1976 U.S. Statistical Abstract (U.S. Department of Commerce, Bureau of the Census), total manufacturers' sales of new blenders, can openers, automatic coffee makers, frypan skillets, hairdryers, irons, automatic toasters, and vacuum cleaners for 1975 amounted to nearly 54 million units nationwide. Pro-rating by population (and neglecting exports), this suggests that some 2000 new units were sold monthly in Santa Monica during 1975.

(iii) The law requires that California sales tax should be collected for most sales in second-hand markets, but enforcement is lax in the less formal markets (such as garage sales).

(iv) One of the charitable organizations operating thrift stores (Goodwill Industries) is concerned less with the sale of second-hand products than with the training of previously "unemployable" persons to undertake the handling, cleaning-up, repair, etc., of these products. The organization, therefore, finds it worthwhile to repair some products that would otherwise have been thrown away by their previous owners (or by the operators of other thrift stores).

(v) Although there is wide variation, the appliances offered for sale in classified advertisements typically carry the highest prices, while those at garage sales and swap meets carry the lowest prices, with thrift stores in-between. This can be explained on the basis of the transaction costs involved.

(vi) Many of the appliances that enter a second-hand market ultimately pass through not one but several different channels, and some end up south of the U.S. border.

SECTION 5
POLICY APPROACHES TO INCREASING PRODUCT LIFETIMES

5.1 Introduction

Assuming that policy-makers might wish to increase the lifetimes of products covered in this study,* a number of possible approaches are briefly reviewed in the following sub-sections. The discussion is based on information gathered in the three parts of the study, as well as additional information obtained from the literature, from contacts with government officials, etc.

It is important to re-emphasize that the study was intended to be exploratory rather than necessarily to provide definitive answers to the questions raised. Considerable caution must therefore be exercised in drawing policy implications directly from the results. Further investigation of some issues is necessary to remedy potential problems arising from the small sample size, possible geographical bias, etc.

The policy approaches will be considered in two groups, as follows:

- policies aimed at increasing the physical durability of products;
- policies aimed at persuading consumers to keep products longer in service.

5.2 Increasing the Physical Durability of Products

One of the hypotheses that the study set out to test was that physical durability (as built in by the manufacturer) might not be the primary determinant of a product's lifetime.

The study revealed that nearly half of the products covered in the consumer survey were disposed of in working order; however, very few of these were thrown away and, therefore, it is not known whether their disposal signified the immediate end of their lifetimes. All that can be said is that many were taken out of service for at least a temporary period. It seems unlikely that increased physical durability would have had a significant influence on these disposal decisions, although it could still be a major factor in determining the products' ultimate lifetimes.

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*This assumption has been made throughout the study. The problem of defining a product's "optimum" lifetime has not been examined, nor have the impacts of different lifetime-extending policies on levels of economic activity, employment, etc.

On the other hand, over half of the products covered in the survey were disposed of in non-working order; these included almost all of the products that were thrown away, many of those that were stored, and a high proportion of those donated to charity. If these originally had been made more durable, then perhaps they would not have broken down and have been disposed of as soon as they were. Of course, some of the reported breakdowns, may have been due to "catastrophic" events, such as dropping from a great height (causing damage that even a more durable product could not have withstood).* Furthermore, the fact that products were broken down did not necessarily mean that they had reached the end of their potential physical lives; many probably could have been repaired and, of those products that were not thrown away (especially those that were donated to charity), some almost certainly were repaired.

5.2.1 Policy options for increasing physical durability

Policies that might be used to promote the manufacture of physically more durable products include:

(i) regulations restricting the sale of products that fail to meet specified standards of durability (e.g., as provided for in the draft Solid Waste Utilization Act, circulated by the Congressional Subcommittee on Transportation and Commerce in 1975);

(ii) economic disincentives penalizing those that fail to meet minimum durability standards or, more generally, discouraging short-lived products (e.g., the so-called "amortisation tax" as proposed by the editors of the Ecologist (1972), or possibly a variation of the solid waste disposal charge currently being studied by the Federal Inter-Agency Resource Conservation Committee**);

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*It may be noted that very few respondents in the consumer survey gave as a reason for disposal that their products had been misused and consequently broken.

**The purpose of the proposed solid waste disposal charge is to make those who are responsible for designing and manufacturing the products that ultimately constitute the waste stream also responsible for paying the costs of collection/disposal of this stream (and thus causing these costs to be reflected in the prices of the products). As currently proposed, at the federal level, the charge would be set equal to the nationwide average direct cost of collection/disposal (about $30 per ton), and it would be limited in coverage to a selection of relatively short-lived packaging and paper products that make up a major portion of the municipal waste stream. However, the charge could be applied to durable products, also, and in principle it might be expected to encourage greater physical durability if (instead of being set at a flat rate) it were set at the present discounted value of the future collection/disposal cost. Whether in practice the amount would be enough to significantly influence manufacturers' actions must be considered doubtful.

(iii) certification by a government agency of the results of durability tests, with point-of-sale disclosure (e.g., as employed in the voluntary Consumer Product Information Labeling Program of the Department of Commerce, currently underway on a trial basis*);

(iv) encouragement of participation in an industry-administered program of durability testing and disclosure (e.g., a program administered by a trade association such as AHAM or VCMA).

A key requirement of all of these policies is that the products be tested for physical durability. For approaches (i) and (ii), the results of the tests would be used to determine whether the sale of a product should be restricted, or how much tax should be levied, thereby giving the manufacturers a direct incentive to increase durability (at least to the level of a standard, if one is established); for approaches (iii) and (iv), the results would be disclosed to consumers, with the intention of making the latter better-informed and perhaps more likely to demand more durable products in the market-place. Considerations relating to testing and disclosure are presented below.

5.2.1.1 Durability testing

The past few years have seen increasing interest in the development of standardized tests to measure various consumer product performance characteristics, including durability. As pointed out by the staff of the Center for Consumer Product Technology, National Bureau of Standards (NBS), industry currently does conduct testing related to durability, but this is generally intended for design evaluation or product control and it is not normally suitable for obtaining uniform lifetime data on all models of a product class available in the market place (Yee, 1977). A committee of the American Society for Testing Materials (ASTM) has been examining possible methods of obtaining this data for vacuum cleaners, and the NBS has been experimenting with blow hairdryers and clothes dryers, but for no product has there yet been general agreement on the establishment of a test protocol. Considerations include:

- the need to define precisely what is meant by durability and the end of a product's physical lifetime (e.g., what constitutes a breakdown or a fall below some minimum acceptable level of performance);
- the need to define appropriate conditions of use that can be reproduced in a laboratory and yet are reasonably representative of conditions to

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*Note that this program is not restricted to the disclosure of durability but rather is intended to provide consumers with information on a range of performance characteristics, the relative importance of which they can decide themselves.

which products are actually exposed by consumers (as confirmed by correlations with field testing);

- the need to use accelerated laboratory testing in order to obtain results within a reasonable period of time;
- the need to select a sample size that is large enough to give statistically significant results and yet permit testing to be conducted at a reasonable cost;
- the need to decide whether all models of a given brand should be tested, rather than just one or more "representative" models;
- the need to decide who should conduct and/or monitor the testing to ensure its validity.

5.2.1.2 Disclosure of test results

Assuming that appropriate test protocols can be devised and implemented, if the results are intended to inform and possibly to influence consumers, there remains the task of providing adequate disclosure. Options include:

(i) point-of-sale labeling (e.g., as used in the Consumer Product Information Labeling Program, mentioned above);

(ii) inclusion in product advertisements (e.g., as encouraged in the Environmental Protection Agency's gas-mileage program); and

(iii) publication in a ratings guide (e.g., a privately issued guide such as Consumer Reports or a guide issued by a government agency).

Considerations include:

- whether the information should come from a private or public source (there might be a difference in the credibility attached by consumers);
- whether consumers would be likely to take durability into account when making purchases (the survey suggested that most consumers view durability as important, but it also revealed that many did not seek information on durability from any source prior to buying the particular products under discussion -- possibly because this information was thought to be unavailable or because the low cost of most of the products did not justify seeking it out);
- how consumers might most effectively be exposed to information on durability (the survey suggested that the majority of people who currently seek this information do so from informal sources; however, most respondents claimed to read labels, and many registered a plea for more informative labels and/or advertisements);

- how to communicate to consumers the true nature of the test results, making them understand that the lifetimes of their products in practice may deviate from the quoted figures owing to statistical variance, differing conditions of use (or abuse), etc. (this might be done by means of a disclaimer, such as that used in the EPA's gas-mileage program).

5.2.2 Other considerations associated with increasing physical durability

Other considerations raised in the study but not fully examined include:

- the likely impact of policies aimed at increasing physical durability on product prices and sales (most consumers said that they would gladly pay more for more durable products, but the survey did not ask how much more); the manufacturers generally claimed that their products are currently made as durable as possible within the price constraints imposed by the market);
- the potential problem that policies might cause durability to be emphasized at the expense of other performance characteristics, especially if manufacturers strive to keep prices constant;*
- the possibility that pressure might be exerted to set durability standards, if adopted, at the lowest commonly achieved level in the industry, thereby encouraging a reduction rather than an increase in average durability;
- the potential problem that the increased costs of introducing a new product (due to the need for testing, etc.) might pose special difficulties for smaller companies.

5.3 Persuading Consumers to Keep Products Longer in Service

The survey suggested that consumers dispose of products for a variety of reasons, often unrelated to whether or not the products are functioning. Even if they have broken down, the option of repair is sometimes available but not pursued, as evidenced by the fact that over two-thirds of the consumers who had disposed of broken products had not even considered having them repaired.

A theme which was repeatedly encountered in the interviews with manufacturers was that American consumers constantly desire change. Many manufacturers

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*This is one reason why the Consumer Product Information Labeling Program is intended to provide consumers with information on a range of performance characteristics, as mentioned in an earlier footnote; the Department of Commerce is working with the industries concerned to identify the most important characteristics to include for each product.

argued that increasing the physical durability of products could be counter-productive unless consumers could at the same time be persuaded to keep these products longer in service.

5.3.1 Policy approaches for keeping products longer in service

Policies that might persuade consumers to keep products longer in service include those that would:

(i) encourage care/maintenance to forestall repair;

(ii) encourage repair when products are not functioning;

(iii) discourage acquisition/disposal based simply on the desire for change;

(iv) encourage disposal options other than throw away or store.

5.3.1.1 Care/maintenance

The manufacturers claimed that many products fail to receive proper care in the household and therefore break down prematurely. Many consumers admitted in the survey that they had not kept track of the operating instructions for their products (if supplied); of those who had, most claimed to have followed them, but far fewer had followed any regular schedule of maintenance.

Policies could possibly be adopted to encourage the improvement of instruction booklets and/or the attachment of more instructions to the products themselves (according to the survey, most were separate). The manufacturers generally argued that they are already making efforts to improve the visibility and clarity of their instructions, but some did concede that they are under pressure to avoid so-called "negative selling", that is, placing too much emphasis on problem avoidance rather than their products' desirable features.

More extensive consumer education on product care/maintenance (e.g., by means of lessons in grade school, adult learning programs, educational television, consumer-oriented public service announcements, etc.) could also be encouraged.

5.3.1.2 Repair

Survey respondents cited several different reasons (and often a combination of reasons) why they had not had their inoperative products repaired. Cost and inconvenience were often mentioned, even by many who had not listed repair as one of the options that they had considered. This suggests that perceptions of what is involved in repair may be important, as well as actual experiences. However, it is evident that, at present prices, the cost of repair can in fact amount to a very high proportion of the cost of buying a new product, so that

consumers may not be irrational in choosing the latter. It appears that, contrary to some people's beliefs, the availability and costs of spare parts do not generally represent the most significant constraints on repair; rather, the main problem is the high cost of labor for a very labor-intensive activity.

At the same time, many of the respondents felt that part of the responsibility for the high costs of repair lies with the manufacturers; a majority felt that "too many products are built in such a way that they can't be easily repaired", a view echoed by some of those actually involved in repair work (e.g., Goodwill Industries). The manufacturers, on the other hand, generally denied that their products are difficult for qualified professionals to repair, although they deliberately discourage home repairs on grounds of safety (and potential liability).

Possible policy options to promote repair include:

(i) encouraging manufacturers to make products that are more readily repaired (possibly with more opportunity for home repairs, at least those of a minor nature that are unlikely to present hazards);

(ii) requiring longer warranty periods or the availability of service contracts;

(iii) requiring manufacturers and/or retailers to provide consumers with easier access to servicing facilities;

(iv) encouraging greater standardization of parts;

(v) subsidizing the repair industry (e.g., allowing stored parts to be written off against tax and/or exempting parts from an inventory tax, when levied), or subsidizing the consumer (e.g., allowing repairs to qualify as tax deductions);

(vi) taxing new products to make the repair of existing products relatively more desirable; and

(vii) educating the public regarding the possibilities for repair (so that at least it becomes an option which they consider).

Considerations include:

- potential problems of safety and liability (as mentioned above);*
- the fact that products returned to retailers under warranty are often replaced over-the-counter, thereby making repair of the original products worthwhile only if some means exists for distributing them afterwards as

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*It may be noted that many people repair their own automobiles -- and take pride in doing so -- often with the assistance (if not the encouragement) of the manufacturers; this is surely a practice that is also potentially hazardous, although it does not often appear to be recognized as such.

"re-builts";*

- the fact that there are many different brands and models of small electrical products on the market, with frequent changes taking place, making it very costly to maintain repair facilities and parts to accommodate them all (one manufacturer pointed out that economies of scale can be realized by having all repairs of a particular product performed at a single location, but this, of course, necessitates the costs and delays of shipping).

5.3.1.3 Consumers' desire for change

As discussed in section 2, about half of the respondents in the consumer survey stated that they had disposed of their old products either because they had no use for them or because they preferred new ones. In section 3, it was reported that many of the manufacturers who were interviewed stressed the apparent importance of change to a large proportion of American consumers, regardless of the functional state of their products. On the assumption that policy-makers might wish to temper this desire for change,** possible approaches include:

(i) making new products more expensive (e.g., through taxation) to discourage consumers from replacing their existing products;

(ii) limiting the frequency of introduction of new models; and

(iii) educating consumers that their desire for change can be wasteful and detrimental to society, as well as being of questionable real benefit to them (since new models of products frequently offer small advantages over existing models, for the additional cost).

One way of accomplishing (iii) might be by means of counter-advertising. While the manufacturers argued that they do not create the consumers' demand for change, some admitted that their advertising practices do, at the least, reinforce this demand. The Federal Trade Commission (FTC), recognizing that advertising usually provides only one aspect of any story, has recommended that the Federal Communications Commission ensure the "right of access in certain defined circumstances of consumer groups and other qualified and interested persons to the broadcast media for the purpose of expressing views and positions on issues raised by commercial advertising" (Thain, 1973). One such issue might be the purported wastefulness of a lifestyle in which consumers

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*This point was stressed by several manufacturers; however, interestingly, few of the products in the consumer survey appear to have broken down under warranty.

**See also sections 6.2.2 and 6.4. below

constantly seek change rather than making prolonged use of their existing products.

5.3.1.4 Choice of disposal option

Given that an owner has decided to dispose of a product, the options that seem to offer the greatest potential for extending that product's lifetime through use by a subsequent owner are:

- giving to a friend or relative;
- donating to charity;
- selling;
- trading in.*

Policy-makers wishing to encourage the selection of one or other of these options might be advised to address the problems of both supply and demand. Possible policy approaches include:

(i) employing consumer education to persuade people of the benefits of having their unused products kept in service by others, rather than being thrown away or stored;

(ii) employing consumer education to persuade people of the benefits of acquiring products used rather than new and to remove any stigma that may be attached thereto;

(iii) facilitating the operation of second-hand markets by providing favorable tax treatment (e.g., exempting all second-hand sales from sales tax); and

(iv) making second-hand products relatively more attractive by raising the price of new products (e.g., through taxation);

(v) encouraging manufacturers and/or retailers not only to accept trade-ins but also to re-build the products (as necessary) and to offer these re-built products for sale.

Considerations include:

- whether a relatively small economic incentive, such as a sales tax exemption, would be sufficient to cause a significant expansion of second-hand markets (many potential sellers are deterred by the inconvenience of placing advertisements, answering calls, etc., while potential buyers are concerned not only about the inconvenience of locating sellers but also about the uncertain quality and reliability of used products);
- whether safety/liability problems would arise (some manufacturers are particularly concerned about losing control of the distribution of their

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*At the present time it seems that trade-in programs often are employed as a marketing technique, and that the products are discarded rather than being re-used. However, trading-in does provide the potential for re-use.

products in second-hand markets other than those that they operate themselves for their own re-builts); and

- whether the handling of stolen goods would become a major problem in expanded second-hand markets (since these are more difficult to monitor than retail markets for new products) and, if so, how to remedy the problem.

SECTION 6
CONCLUDING COMMENTS AND RECOMMENDATION

6.1 Introduction

This study set out to examine the reasons why people dispose of certain small electrical household products, with a view to assisting in the development of policies to extend the lifetimes of these products. It was acknowledged at the beginning that, since there has been virtually no previous research on this topic, the study would be exploratory; rather than necessarily providing definitive answers to the questions raised, the intention was to identify some of the key factors and concerns, on which future studies could then focus. Under these circumstances, and given the resources available, it was considered appropriate to limit the scope of the study (with respect to both geographical coverage and size of survey sample), although this meant that the results should be generalized only with great caution.

An early finding of the study was that the rate of disposal of small electrical products among the households contacted in the survey pre-test and subsequent screening was fairly low (33 percent of those who answered the telephone screener questions). This meant that, in order to ensure a sufficiently large number of survey respondents (given the limited time and resources available), the research team had to work throughout with a rather long list of products rather than narrowing this list down, as had originally been intended. The sample sizes for some individual products were very small, thereby limiting the significance that can be attached to some of the product-specific findings.

With these limitations in mind, information gathered in the study was used as an input to the discussion in the preceding section on possible policy approaches for extending product lifetimes.

This final section presents some additional findings and thoughts regarding the acquisition and disposal of small electrical appliances, especially those costing less than about $30 (which made up the bulk of those covered in the study); it also presents some suggestions for further investigation, and for policy makers who may not be able to wait for more studies but need to act on the "best available information", some concluding recommendations.

6.2 Additional Findings and Thoughts on Acquisition and Disposal

6.2.1 Acquisition

- Many small electrical products are received as gifts, only some of which are discussed with the recipient beforehand; this may be significant in that the criteria used in purchasing gifts might differ from those used in purchasing for self-use (e.g., appearance might be given relatively greater weight than durability).
- Most of those purchasing the products for self-use appear to be concerned about durability (as well as performance, reliability, etc.) in a general way, but very few obtain specific information about the durability of intended purchases other than that based on their own or their friends' experiences with similar, though not necessarily identical products. Many have little or no real idea at purchase of how long their products might be expected to last. This may be because reliable information is not available, because durability is not considered a sufficiently important attribute of this set of (relatively inexpensive) products to warrant seeking out the information,* or because all of the brands/models available are thought to have similar durability.
- Most people purchase a given product at a price that is not greatly dissimilar from the price of most other versions of the same product available in the market. The manufacturers generally argued that this causes them to tailor the design (including the potential durability) of their products to a pre-specified price range; however, another possible explanation is that this is the effect of the manufacturers' unwillingness to broaden the range of design options and associated prices (i.e., that the consumers may currently have little choice with regard to durability or other design features).

6.2.2 Disposal

- Even though many consumers complain in general terms about the durability of small electrical appliances, a large proportion seem to be satisfied with the years of use given by specific products. Those products that last three years or less seem to give rise to the greatest amount

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*Especially as those who do attempt to seek out information on durability may become overwhelmed when they learn about the complexity of the concept.

of dissatisfaction, and represent the most obvious targets for policies aimed at extending product lifetimes through increased physical durability.

- It appears that consumers dispose of their longer-lived products out of a desire for, or as a result of, change about as frequently as they do because of breakdowns. Moreover, the fact that a high proportion of those whose products are inoperative do not even consider having them repaired, suggests that at least some consumers use the need for repair (however minor) as an "excuse" for change.
- In seeking change, consumers may replace an existing product with one that:
  - (i) is technically superior in performing the same function;
  - (ii) performs a different function;
  - (iii) is functionally similar but different in appearance (i.e., more stylish").

  In practice it seems likely that a given change might fit more than one of these categories. For example, a consumer might acquire a new food processor that not only performs better as a mixer than the product it has replaced, but is more versatile (in that it also chops, blends, grates, etc.) and more modern in appearance.
- A question that policy-makers wishing to extend product lifetimes must consider is whether changes that fall into any or all of the three categories should be discouraged, recognizing that only those falling into category (iii) have traditionally been labeled as "wasteful". According to the manufacturers, style changes are rarely introduced by themselves (due to the high cost of doing so); rather they typically accompany technical changes.* Their importance is argued on the grounds that, in a competitive situation, each firm must use a product's appearance as one means of attracting those who are entering the market anyway; it is denied (by the manufacturers) that they are intended to make current owners dissatisfied with the appearance of their older products, although this may in practice be an effect.

6.3 Specific Suggestions for Further Investigation

If a more complete understanding of the factors affecting the lifetimes of small electrical appliances is desired, further investigation is needed to:

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*Of course, this is not to say that all technical changes are necessarily worthwhile.

(i) expand the geographical coverage and sample size of the consumer survey to determine the general validity of the results reported in this study; and

(ii) explore certain issues identified as potentially important in this study, but on which insufficient data were obtained.

Some specific issues worthy of further investigation include:

- Do people perceive different brands/models of the same small electrical product as having different durabilities?
- How much more would people actually be prepared to pay for increased durability, and under what circumstances (e.g., would they need the durability to be guaranteed)?
- When people buy products as gifts, do they use different purchasing criteria than they do when they are buying for their own use?
- On what do people base their estimates of expected product lifetime?
- Based on what criteria do people state that they have been satisfied or dissatisfied with the length of time that a product has lasted?
- When people think about the price of a product (e.g., when making a choice between repair or replacement), do they think of the price actually paid (possibly some years beforehand), the price adjusted in some way for inflation, or the observed/estimated price for a replacement?
- Do people generally have an accurate idea of the actual price of repairing their products, the expected years of use following repair, and the price of buying replacements?
- What would it take to persuade more people to have their non-functioning products repaired (e.g., improved access to repair shops, lower prices, etc.)?
- Prior to the disposal action being reported, how many people had their products in storage? For how long? For what reasons?
- In practice, what typically happens to products placed in storage (i.e., does storage generally represent the end of a product's lifetime)?

6.4 Recommendations for Policy-Makers

As stated several times earlier in the report, this study was exploratory and many of the findings should not be viewed as necessarily conclusive for the U.S. population as a whole. Nevertheless, recognizing that the demands of policy-making usually do not permit the collection of complete information in advance, the following recommendations are offered as the "best available"

at the present time for increasing the lifetimes of small electrical appliances (assuming that this is the goal):

(i) Policies for increasing the physical durability built in by manufacturers should be pursued for certain products, especially those relatively inexpensive appliances (such as blow hairdryers) which were shown in the survey to frequently malfunction in three years or less. An alternative might be to make repair a less costly and more attractive option, but given the realities (that repair, being labor-intensive, is intrinsically expensive and that consumers often fail to even consider repairing these products), it seems wiser to focus on delaying the time at which products first cease to function.

(ii) In view of the problems of repair just mentioned, consumers should be encouraged to transfer products which have broken down (and would otherwise have been thrown away or stored) to an organization (such as Goodwill Industries) that specializes in repair or to a manufacturer that operates a re-building program.

(iii) Recognizing that many consumers stop using their products even though they are still functioning, consideration should also be given to measures that might encourage longer use. Policies would have to be aimed both at consumers, who seem to have a desire for frequent change, and at manufacturers, who undoubtedly (and understandably, given their goals in a competitive situation) foster this desire.

(iv) To the extent that policy-makers might not be willing or able to discourage change per se, they should direct their efforts at ensuring that products which are no longer used by their original owners are passed on (through informal and formal channels) for subsequent use by new owners.

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APPENDIX A

PRE-SCREENER QUESTIONNAIRE
(With Interviewers' Description of Disposal Options)

1. Interviewer name:_____

2. Tract called:_____

3. Region called:_____

4. I.D. number of completed screening interview:_____

Hello, my name is _____ and I work for The Planning Group. We have been hired by Professor Conn of the UCLA Urban Planning Program to conduct a survey in the City of Santa Monica. We are interested in finding out how people use various kinds of home appliances, and we are hoping that the results of our study will be of help in reducing waste, conserving natural resources, and protecting the environment. We are calling people at random, which is how we reached you. I would like to ask you a few questions over the phone, and if you are interested, I may ask you to participate further in our study. Your answers would be held strictly confidential and would be seen by no one except the researchers who would be analyzing them. If you have any questions about the study, I would be pleased to answer them. You are, of course, under no obligation to participate, but I am hoping that you will agree to do so.*

****

I am going to read you a list of electrical appliances. For each of these, I would like to know what you or anyone else in your household may have done with this item in the past twelve months. If you have never owned one or more of the appliances I read, please say so. Once I start the list, if I am reading too fast or you don't understand something, please stop me and I'll go over it again.

INTERVIEWER: START WITH FIRST APPLIANCE ON PAGE 2 AND READ THE FOLLOWING:

"During the past twelve months, have you done any of the following things with a (READ TYPE OF PRODUCT) :"

1. Repaired it or had it repaired
2. Threw it away
3. Stored it somewhere, such as the garage, basement, in a storage locker, etc.
4. Sold it to a second hand store, at a garage sale or swap meet, through an ad, to another person, etc.
5. Donated it to charity (e.g., organization or event)
6. Gave it away to a friend, relative or someone else
7. Traded it in on another one
8. NONE OF THE ABOVE DONE WITH THE ITEM

INTERVIEWER: ENTER CODE FOR R'S ANSWER AND CONTINUE WITH PRODUCTS B THROUGH N ON PAGE 2. AFTER YOU COMPLETE THESE, GO TO PAGE 3.

* If respondent appears hesitant, he/she may be offered the opportunity of calling The Planning Group or Professor Conn's office at UCLA to verify the legitimacy of the survey.

PRODUCT	ENTER CODE FOR WHAT R FINALLY DID	How many months ago did you (...)?	DID NOT OWN IN PAST 12 MONTHS
A. Toaster (toast/warm only)			
B. Toaster oven (toast/bake/broil at pre-set degree temperature)			
C. Electric mixer			
D. Electric can opener			
E. Electric coffee maker			
F. Blender			
G. Electric skillet or frying pan			
H. Hand-held blow-type hair dryer			
I. Standard bonnet-type hair dryer			
J. Electric tooth brush			
K. Black-and-white portable TV			
L. Radio			
M. Vacuum cleaner			
N. Iron			
O.			
P.			
Q.			

CODES FOR PRODUCT DISPOSAL OPTIONS

1 = REPAIRED	5 = DONATED TO CHARITY
2 = THREW AWAY	6 = GAVE AWAY TO SOMEONE
3 = STORED	7 = TRADED IN
4 = SOLD	8 = DID NONE OF THE ABOVE WITH PRODUCT

INTERVIEWER: AFTER COMPLETING LIST (ITEMS A-N) ASK:

"Have you done any of the things we've talked about with some other small electrical household items that I didn't have on my list? IF YES, GO TO ITEM O ON PAGE 2 AND ENTER INFORMATION. ASK FOR UP TO TWO MORE. AFTER COMPLETING LIST, CIRCLE ONE BELOW.

R IS CODE "2" THROUGH "7" ON ONE OR MORE OF PRODUCTS "A" THROUGH "N" ONLY.....ASK A

ALL OTHERS.....END OF INTERVIEW

A. I see that you have done something with one or more of your household appliances during the past twelve months. We would like to talk with you about this in a little more detail. May we interview you in your home some time soon? The interview would last about 30 minutes. You are not obliged to participate, but we really would be most grateful if you would, as your answers would be extremely important and valuable to us.

YES.....GO TO B

NO.....TRY ONE PERSUASION EFFORT BEFORE ENDING INTERVIEW

B. Thank you very much. We will be calling you to arrange a home interview appointment at your convenience some time in the next few days. I'd like to verify your number (REPEAT) and may I have your name and address (RECORD BELOW). Can you tell me at what hour of the day you can be reached by telephone so an interview appointment can be arranged? Thank you for your interest and cooperation.

NAME:_____

ADDRESS:_____

TELEPHONE:_____

DAYS/HOURS TO CONTACT BY PHONE:_____

_____

OFFICE TELEPHONE:_____

ASSIGNED TO:_____

DATE:_____

Description of Disposal Options

Please note that we are interested in the final disposition the person took on some particular small electrical appliance. If they stored it first then eventually donated it to a charity drive, the final disposition would be donated (i.e., #5). Most of the disposal options are self-explanatory, but please be familiar with the following descriptions so you can correctly classify what the person may have done.

1. REPAIRED - This option is not eligible as a final disposition for purposes of this study. It is included only because we are using the screener as an opportunity to see how many people have repaired items and/or repaired them before they finally did something else with them. Any item that has Code 1 as its only disposition is not eligible for inclusion in the study.

2. THROWN AWAY - Self-explanatory, and it is not necessary for us to know how or where the product was thrown away. However, please make sure that the product was actually thrown away (i.e., in the trash, garbage collection, etc.) and not just casually given away to someone.

3. STORED - The definition of storage can be tricky, so make sure you understand what the person did before you code it as storage (i.e., code #3). Storage would not apply to items or products that the person uses infrequently or seasonally but definitely intends to use again. Storage means that the person has stopped using the product, put it away somewhere, has no definite intent of future use but has not yet thrown the item away or done something else with it. On the pre-test, some people mentioned that they were storing something until someone came along who could use it (i.e., they would either sell it or give it away). Others said they were storing things until they had enough for a garage sale (i.e., #4) or to take it to Goodwill, etc. (i.e., #5). As long as the person hasn't done anything else with the item, regardless of what they say they might do with it in the future, the final disposition at the time is stored.

4. SOLD - This includes both selling somewhere (e.g., garage sale, swap meet, second-hand store, etc.) and selling to someone (e.g., through an ad, to a friend, etc.). The critical point here is that the person got cash for the product. SPECIAL NOTE: If the person says "I sold it at a pawn shop", do not code this as true selling. Write in "pawn shop" and enter code 8. If the person says, "I am currently trying to sell it", this would also be code 8 unless some other option also applied, such as taking it out of storage to sell it. Until the sale is completed, the item has not received a final disposition of sold. If this is the case, code as some other option (if applicable) or as code 8 (none of the above).

5. DONATED - This would include all products donated to a charitable organization (e.g., Goodwill, Salvation Army, women's club, church, etc.) or to a charitable function (e.g., rummage sale, auction, thrift shop, etc.). The act of donation usually implies that the person will receive some kind of receipt for tax deduction purposes. Donation would generally not include giving things to a specific needy person or family; this would be covered by the following category.

6. GAVE AWAY - This would include all products that were given to someone else for no cash or tax deduction value. The person receiving the product could be a relative, friend, casual acquaintance, or someone whom the person defines as "in need".

7. TRADED-IN ON ANOTHER ONE - This would apply only when the person says that they used the old item as part of the deal in acquiring a new product of the same type. For example, the person traded-in their old mixer plus $10 and got a new mixer.

8. NONE OF THE ABOVE - This code is to be used for all products that the person has but with which they have done nothing in the past twelve months or if they have done something with it that is not covered by codes 2 through 7. If this is the case, enter code 8, but please specify what the person did (e.g., "took it to a pawn shop", etc.). Make sure that you do not use code 8 unless you are sure that the person has not done anything with the product that can be applicable under codes 2 through 7.

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APPENDIX B

RESULTS OF PRE-SCREENER CONTACTS

Result	Number	Percent
Total number called	3,291	100
Calls not completed	- 609	19
non-residence		
answering service		
disconnected; no longer in service		
Total contacted	2,682	81
Refused to answer question	- 789	24
refused to answer		
child answered		
non-English speaking		
Total who answered question	1,893	58
No item disposed of	-1,264	38
Item disposed of -- Eligible	629	19
Refused interview	- 123	4
Item disposed of and willing to be interviewed	506	15
Interview not completed	- 195	6
not at home		
refused to be interviewed		
ineligible -- no item disposed of		
Completed interviews	311	9

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APPENDIX C

SURVEY QUESTIONNAIRE
AND RESPONSE FREQUENCIES

STUDY OF PRODUCT LIFETIME

Conducted by:

THE PLANNING GROUP, INC.

1728 Silverlake Blvd.

Los Angeles, California 90026

June, 1977

Conducted for:

PROFESSOR DAVID CONN

School of Architecture & Urban Planning

University of California, Los Angeles

ASSURANCE OF CONFIDENTIALITY

Households participating in this survey were selected at random. All data will be held in strict confidence and no information will be traceable to specific households. Data will be grouped for statistical purposes only and no individual participants or households will be identified.

PRODUCT LIFETIME HOUSEHOLD INTERVIEW

NAME: _____

ADDRESS: _____ PHONE: _____

CALL RECORD

	Day & Date	Hour Called	Result of Call
1.		AM PM	
2.		AM PM	
3.		AM PM	
4.		AM PM	
5.		AM PM	

CODES FOR RESULT OF CALL	
1- No one home/No answer	5- Interview completed
2- R not at home	6- Non-interview (Enter the letter code for type of non-interview after code 6. (See letter codes below.)
3- Appointment made	
4- Appointment cancelled	

LETTER CODES FOR NON-INTERVIEWS	
A- Unit vacant	F- Secure residence/apt. bldg.
B- Address not a dwelling unit	G- R no longer at this address
C- No such address	H- Contact or R incapable
D- No one/R not home, final call	I- Contact or R refused
E- Language barrier	J- Other (specify above)

BEGIN CARD 2

STUDY OF FACTORS AFFECTING PRODUCT LIFETIME

ENTER START TIME:

1. When we spoke to you on the phone earlier, you said that you had recently...

	n	SCREENER VERIFIED		n	
thrown away	69	☐ 22.2	☐ 20.9	65	
put into storage	122	☐ 39.2	☐ 41.2	128	
sold	24	☐ 7.7	☐ 6.8	21	
donated to charity	34	☐ 10.9	☐ 10.9	34	a _____ (PRODUCT)
given away to friend or relative	55	☐ 17.7	☐ 18.0	56	
traded in	7	☐ 2.3	☐ 2.3	7	

(TO BE CHECKED PRIOR TO INTERVIEW)

Is that correct?

IF "YES", CHECK RIGHTHAND COLUMN ABOVE
IF "NO", ASCERTAIN DISCREPANCY AND CHECK APPROPRIATE BOX IN RIGHTHAND COLUMN OR TERMINATE

2. Approximately when did this occur?

Month _____ Year 1976 ☐
1977 ☐

3. Did you get another _____?

		n
YES	ASK A & B 51.1	159
NO	SKIP TO Q4 ..... 48.9	152

A. Did you get the new _____ before or after you decided to _____ your _____?

	n
BEFORE 46.5	74
AFTER 52.5	83
DON'T REMEMBER 1.3	2

B. Did you purchase the new _____ or did someone give it to you?

	n
PURCHASED 69.8	111
GIVEN 26.4	42
OTHER 3.8	6

SPECIFY: _____

4. Would you please tell me a bit about the circumstances which led to your decision to _____. (PROBE FOR COMPLETENESS AND CLARITY)

_____

_____

_____

_____

_____

_____

5. Before you actually _____ your _____, did you consider doing anything else with it?

			n
YES	GO TO Q6	34.7	108
NO	SKIP TO Q7	64.6	201
DON'T KNOW/REMEMBER	SKIP TO Q7	0.6	2

6. What did you consider doing? (CHECK R'S ANSWERS UNDER THE "FREE RESPONSE" COLUMN AND ADD ANY THAT ARE NOT INCLUDED UNDER THIS HEADING. THEN GO TO "FIXED RESPONSE" COLUMN AND ASK IF R CONSIDERED THOSE DISPOSITIONS NOT SPECIFICALLY MENTIONED IN THE FREE RESPONSE COLUMN).

FREE RESPONSE	Considered	n	FIXED RESPONSE: Did you seriously consider (...)		n
THROWING AWAY	17.3	14	Throwing _____ away?	10.4	7
STORING	10.0	6	Storing the _____?	5.6	3
SELLING	16.8	17	Selling the _____?	7.1	6
DONATING	20.2	20	Donating the _____?	11.4	9
GIVING TO A FRIEND	16.0	15	Giving the _____ away?	10.1	8
TRADING IN	2.9	3	Trading the _____ in?	0.0	0
REPAIR	46.3	50			
_____					

NOW, SKIP TO SPECIAL INSTRUCTIONS FOLLOWING Q7

7. I am going to read you some things people have told us they have done with products they've owned. For each one, would you tell me if you seriously considered it rather than _____ your _____ ? Did you seriously consider _____? (READ A-F, SKIPPING THE DISPOSAL OPTION R ACTUALLY USED.)

	YES	n	NO	n	DON'T KNOW/ REMEMBER	n
A. Throwing it away?	7.9	13	90.9	150	1.2	2
B. Storing it?	7.3	9	91.9	113	0.8	1
C. Selling it?	2.6	5	96.3	182	1.1	2
D. Donating it?	12.4	22	86.5	154	1.1	2
E. Giving it to a friend/relative?	6.2	10	93.2	150	0.6	1
F. Trading it in on another one?	2.5	5	96.5	192	1.0	2

SPECIAL INSTRUCTIONS

REFER TO Q6 AND Q7 AND CHECK THE OTHER ITEM DISPOSITIONS R CONSIDERED. THESE CHECKS WILL TELL YOU WHICH QUESTIONS TO ASK AFTER YOU HAVE COMPLETED THE FOLLOWING SECTION. COMPLETING THIS INFORMATION MAY CAUSE A SLIGHT BREAK IN THE INTERVIEW. IF R ASKS ANYTHING, PLEASE EXPLAIN THAT YOU ARE DOING SOME PREPARATION WORK FOR QUESTIONS COMING UP AND THAT THE INTERVIEW WILL RESUME SHORTLY. CHECK QUESTIONS YOU WILL ASK IN BOXES NEXT TO Qs15-20.

	CONSIDERED		n
THROW AWAY	13.8	(CHECK Q15, PAGE 7)	34
STORED	9.8	(CHECK Q16, PAGE 7)	18
SELL	9.7	(CHECK Q17, PAGE 8)	28
DONATE	18.4	(CHECK Q18, PAGE 8)	51
GIVE TO A FRIEND/RELATIVE	12.9	(CHECK Q19, PAGE 9)	33
TRADE IN	2.6	(CHECK Q20, PAGE 9)	8
R DID NOT CONSIDER ANY ALTERNATIVES	60.5	(GO TO Q21, PAGE 10)	188

INTERVIEWER, REFER TO Q1 AND CIRCLE ONE:

			n
R PUT ITEM INTO STORAGE	GO TO Q8	41.2	128
R DONATED ITEM	SKIP TO Q9	10.9	34
R THREW ITEM AWAY	SKIP TO Q10	20.9	65
R SOLD ITEM	SKIP TO Q11	6.8	21
R GAVE ITEM TO FRIEND/RELATIVE	SKIP TO Q13	18.0	56
R TRADED ITEM IN	SKIP TO Q14	2.3	7

FIRST MOST IMPORTANT REASON FOR STORING

8. What are the most important reasons why you put the _____ into storage instead of disposing of it in some other manner?

			n
A.	THOUGHT I'D FIX IT MYSELF	3.1	4
B.	MAY REPAIR IT SOME TIME IN THE FUTURE	11.7	15
C.	SOMEONE I KNOW MIGHT WANT ONE SOMEDAY AND BE WILLING TO REPAIR THIS ONE	3.9	5
D.	IT WAS A GIFT SO I DIDN'T WANT TO GET RID OF IT	4.7	6
E.	WILL TAKE IT SALVATION ARMY/GOODWILL WHEN I ACCUMULATE ENOUGH STUFF TO MAKE TRIP/CALL WORTHWHILE	3.1	4
F.	COULDN'T DECIDE WHAT ELSE TO DO WITH IT	15.6	20
G.	IT SEEMED TOO NICE TO THROW AWAY	7.0	9
H.	I DIDN'T REALLY USE IT ENOUGH TO JUSTIFY THE REPAIR EXPENSE BUT I MIGHT WANT ONE SOMETIME IN THE FUTURE	0.0	0
I.	DIDN'T WANT TO CONTRIBUTE TO WASTE PROBLEM	0.8	1
J.	WOULD FEEL GUILTY ABOUT THROWING IT AWAY	2.3	3
K.	PLANNING A GARAGE SALE IN THE FUTURE	3.1	4
L.	MAY WANT TO TAKE IT TO A SWAP MEET SOMEDAY	0.0	0
M.	YOU NEVER KNOW WHEN IT OR SOME PART OF IT MIGHT COME IN HANDY	13.3	17
N.	I JUST MIGHT THINK OF SOME OTHER USE FOR IT ONE DAY	10.9	14
O.	IT STILL WORKS	13.3	17
P.	USED OCCASIONALLY	0.8	1
Q.	USED SEASONALLY	0.0	0

NOW, RETURN TO SPECIAL INSTRUCTIONS ABOVE AND FOLLOW DIRECTIONS

FIRST MOST IMPORTANT REASON FOR DONATING

9. What are the most important reasons why you donated your _____ to charity instead of disposing of it in some other manner?

			n
A.	IT MAKES ME FEEL GOOD	2.9	1
B.	THE PEOPLE AT GOODWILL/SALVATION ARMY NEED JOBS -- I COULD HELP THEM OUT	29.4	10
C.	I KNEW IT WAS WORTH SOMETHING BUT I DIDN'T WANT TO GO THROUGH THE TROUBLE OF REPAIRING IT	17.6	6
D.	I KNEW IT WAS WORTH SOMETHING BUT I DIDN'T WANT TO GO THROUGH THE TROUBLE OF SELLING IT	5.9	2
E.	INCOME TAX DEDUCTION	2.9	1
F.	SOMEONE MIGHT AS WELL GET SOME USE OUT OF IT	17.6	6
G.	THROWING IT AWAY WOULD HAVE BEEN WASTEFUL	0.0	0
H.	IT WAS TOO FAR GONE TO BE WORTH REPAIRING -- THEY MIGHT NOT THINK SO	0.0	0
I.	IF THEY DON'T WANT IT THEY CAN THROW IT AWAY	0.0	0
J.	I DIDN'T KNOW ANYONE WHO WANTED IT	0.0	0
K.	I DON'T WANT ANOTHER ONE SO COULDN'T TRADE IT IN	0.0	0
L.	IT SEEMED LIKE THE BEST THING TO DO (MADE THE MOST SENSE)	5.9	2
M.	I LIKE TO HELP PEOPLE OUT	11.8	4
N.	IT'S AN EASY WAY TO GET RID OF STUFF -- THEY PICK IT UP	5.9	2

NOW, RETURN TO SPECIAL INSTRUCTIONS ON PAGE 3 AND FOLLOW DIRECTIONS

FIRST MOST IMPORTANT REASON FOR THROWING OUT

10. What are the most important reasons why you threw away the _____ instead of disposing of it in some other manner?

			n
A.	TOO OLD TO REPAIR	10.8	7
B.	REPAIRED SEVERAL TIMES BEFORE	3.1	2
C.	DAMAGED BEYOND REPAIR	29.2	19
D.	WOULDN'T BE WORTH MUCH EVEN IF REPAIRED (THEREFORE NOT GIVEN TO SALVATION ARMY, ETC.)	9.2	6
E.	COULDN'T BE REPAIRED AT REASONABLE PRICE	13.8	9
F.	NEW MODEL SO MUCH BETTER THAT THE OLD ONE WASN'T WORTH REPAIRING	3.1	2
G.	COULDN'T THINK OF ANYONE TO GIVE IT TO	1.5	1
H.	IT WAS SO OLD NO ONE WOULD WANT IT	0.0	0
I.	BEEN WANTING A NEW ONE	1.5	1
J.	NO PLACE TO STORE IT	3.1	2
K.	COULDN'T THINK OF ANYTHING ELSE TO DO WITH IT	6.2	4
L.	ANYTHING ELSE WAS TOO MUCH TROUBLE	10.8	7
M.	WOULD TAKE TOO MUCH TIME TO REPAIR THE OLD ONE	1.5	1
N.	I KNEW I'D NEVER NEED IT AGAIN	1.5	1
O.	I WOULD HAVE GIVEN IT TO A CHARITY BUT THEY WON'T PICK UP STUFF UP	0.0	0
P.	I WOULD HAVE GIVEN IT TO A CHARITY BUT THEY NEVER TELL YOU WHEN THEY'11 COME BY TO PICK IT UP -- IT'S TOO MUCH TROUBLE TO STAY HOME ALL DAY WAITING FOR THEM	0.0	0
Q.	I GOT MY MONEY'S WORTH ALREADY	0.0	0
R.	COULDN'T SELL	0.0	0

NOW, RETURN TO SPECIAL INSTRUCTIONS ON PAGE 3 AND FOLLOW DIRECTIONS

FIRST MOST IMPORTANT REASON FOR SELLING

11. What are the most important reasons why you sold your _____ instead of disposing of it in some other manner?

			n
A.	IT WAS STILL TOO GOOD TO THROW AWAY	4.8	1
B.	SOMEONE MIGHT BE WILLING TO REPAIR IT -- I WASN'T	0.0	0
C.	I COULD USE THE MONEY	23.8	5
D.	I DIDN'T WANT ANOTHER ONE BUT I WANTED TO GET SOMETHING FOR IT (SO I SOLD IT INSTEAD OF TRADING IT IN)	4.8	1
E.	IT WOULD BE A BARGAIN FOR SOMEONE WHO IS ABLE TO REPAIR STUFF	0.0	0
F.	THIS IS A POPULAR ITEM ON THE SECOND HAND MARKET -- I WAS SURE I COULD SELL IT	0.0	0
G.	GARAGE SALES ARE FUN -- THE MORE STUFF THERE THE BETTER	9.5	2
H.	IF SOMEONE ELSE IS WILLING TO PAY FOR IT, I MIGHT AS WELL GET SOMETHING FOR IT	14.3	3
I.	I DIDN'T USE IT ENOUGH TO MAKE IT WORTH REPAIRING	0.0	0
J.	I WANTED A MORE UP TO DATE MODEL SO I DIDN'T WANT TO REPAIR THIS ONE	0.0	0
K.	A SECOND HAND MARKET IS A GOOD WAY TO GET SOME MONEY WITHOUT IRS KNOWING ABOUT IT	0.0	0
L.	EVEN THOUGH IT WAS BROKEN IT WAS WORTH TOO MUCH TO GIVE AWAY	0.0	0
M.	I GO TO SWAP MEETS ALL THE TIME	0.0	0
N.	IT DIDN'T MAKE SENSE TO WASTE THE PARTS/MATERIALS	0.0	0
O.	SOMEONE WHO JUST WANTED PART OF IT COULD BUY IT	4.8	1
P.	I TRIED TO TRADE IT IN BUT COULDN'T	0.0	0
R.	IT'S A GOOD THING TO DO -- PEOPLE THROW AWAY TOO MUCH STUFF THESE DAYS	4.8	1
S.	I COULD USE THE MONEY TO BUY A NEW ONE	0.0	0
T.	SOMEONE COULD STILL GET GOOD USE OUT OF IT	4.8	1

12. (SHOW CARD #12) Where did you sell it? (ONE ANSWER ONLY)

			n
A.	GARAGE SALE	45.0	9
B.	SWAP MEET	5.0	1
C.	SECONDHAND STORE	0.0	0
D.	NEWSPAPER ADVERTISEMENT	10.0	2
E.	BULLETIN BOARD	0.0	0
F.	INFORMALLY TO A FRIEND	30.0	6
G.	OTHER	10.0	2

SPECIFY: _____

NOW, RETURN TO SPECIAL INSTRUCTIONS ON PAGE 3 AND FOLLOW DIRECTIONS

FIRST MOST IMPORTANT REASON FOR GIVING AWAY

13. What are the most important reasons why you gave the _____ to your friend/relative instead of disposing of it in some other manner?

		n
A.	NICE THING TO DO	16.1 9
B.	THEY NEEDED ONE AND COULDN'T AFFORD A NEW ONE BUT COULD AFFORD TO REPAIR THIS ONE	39.3 22
C.	BETTER THAN THROWING IT AWAY	3.6 2
D.	THEY WERE ABLE TO FIX IT	1.8 1
E.	I NEVER USED IT ANYMORE	12.5 7
F.	NOT GOOD ENOUGH FOR ME ANYMORE BUT GOOD FOR COUPLE JUST STARTING OUT OR KID AT COLLEGE	7.1 4
G.	IT STILL WORKED WELL	10.7 6

NOW, RETURN TO SPECIAL INSTRUCTIONS ON PAGE 3 AND FOLLOW DIRECTIONS

FIRST MOST IMPORTANT REASON FOR TRADING

14. What are the most important reasons why you traded in your _____ instead of disposing of it in some other manner?

		n
A.	WOULD LOWER THE PRICE OF A NEW ONE	42.9 3
B.	IT WOULD HAVE BEEN A WASTE TO THROW IT AWAY	0.0 0
C.	IT WAS STILL WORTH SOMETHING	28.6 2
D.	I COULDN'T FIX IT BUT IT WAS TOO GOOD TO GIVE AWAY	0.0 0
E.	I WANTED A NEWER MODEL (OLD ONE WASN'T BROKEN)	28.6 2

NOW, RETURN TO SPECIAL INSTRUCTIONS ON PAGE 3 AND FOLLOW DIRECTIONS

(INTERVIEWER, PUT CHECK MARK IN BOX NEXT TO QUESTIONS TO BE ASKED)

You mentioned that you considered an/some alternative(s) before you (DISPOSITIONED) the (PRODUCT). I'd like to ask you a few questions about this.

BEGIN CARD 3

FIRST MOST IMPORTANT REASON FOR NOT THROWING AWAY

☐ 15. What are the most important reasons why you didn't throw away your _____?

			n
A.	IT WAS STILL WORTH SOMETHING	23.5	8
B.	SOMEONE I KNEW COULD USE IT	8.8	3
C.	WASTE OF RESOURCES -- SEEMED LIKE A WASTE	11.8	4
D.	THERE'S TOO MUCH TRASH ALREADY	0.0	0
E.	I LIKE TO GIVE TO GOODWILL/SALVATION ARMY	8.8	3
F.	I SELL THIS TYPE OF THING AT SWAP MEETS	0.0	0
G.	I SELL THIS TYPE OF THING AT GARAGE SALES	0.0	0
H.	I KNEW I COULD GET SOME MONEY FOR IT	2.9	1
I.	I MIGHT NEED IT AGAIN SOMEDAY	5.9	2
J.	I MIGHT NEED ONE OF THE PARTS SOMEDAY	5.9	2
K.	I JUST DON'T THROW ANYTHING AWAY -- PACK RAT	14.7	5
L.	IT WASN'T BROKEN	5.9	2
M.	SOMEDAY I MIGHT GET IT FIXED	5.9	2
N.	IT MIGHT BECOME A COLLECTORS ITEM	0.0	0
O.	ONE OF MY CHILDREN COULD USE IT WHEN THEY LEAVE HOME	0.0	0
P.	IT WAS A GIFT	2.9	1

NOW, GO TO NEXT ALTERNATIVE DISPOSITION CHECKED OR SKIP TO Q21 IF NO OTHER DISPOSITIONS ARE CHECKED

FIRST MOST IMPORTANT REASON FOR NOT STORING

☐ 16. What are the most important reasons why you didn't put your _____ in storage?

			n
A.	I DON'T HAVE ENOUGH ROOM	22.2	4
B.	I KNEW IT WOULD JUST STAY THERE FOREVER	5.6	1
C.	I KNEW I'D NEVER USE IT AGAIN	5.6	1
D.	IT'S BETTER TO LET SOMEONE GET SOME USE OUT OF IT THAN TO HAVE IT STORED AT MY HOUSE	11.1	2
E.	I KNEW I'D NEVER REPAIR IT	0.0	0
F.	I KNEW SOMEONE WHO NEEDED IT	38.9	7
G.	I WANTED A NEW ONE AND WAS ABLE TO TRADE IT IN	0.0	0
H.	I PREFER TO DONATE THIS TYPE OF THING TO A CHARITY	0.0	0
I.	I PREFER TO SELL THIS TYPE OF THING AT A SWAP MEET/ GARAGE SALE	0.0	0
J.	I KNEW I COULD GET MONEY FOR IT	0.0	0
K.	ITS DANGEROUS TO HAVE A LOT OF CLUTTER AROUND THE HOUSE	0.0	0
L.	IT WASN'T WORTH ANYTHING NOW SO CERTAINLY WOULDN'T BE LATER	5.6	1
M.	I WAS REALLY TIRED OF IT -- NEVER WANTED TO SEE IT AGAIN	0.0	0

NOW, GO TO NEXT ALTERNATIVE DISPOSITION CHECKED OR SKIP TO Q21 IF NO OTHER DISPOSITIONS ARE CHECKED

☐ 17. What are the most important reasons why you didn't sell your _____?

		n
A.	TOO MUCH TROUBLE	14.3 4
B.	IT WASN'T WORTH MUCH	17.9 5
C.	IT WAS SO OLD NO ONE WOULD HAVE BEEN ABLE TO GET THE PARTS TO FIX IT	0.0 0
D.	TRIED -- NO ONE BOUGHT IT	17.9 5
E.	THIS IS NOT A POPULAR SWAP MEET/GARAGE SALE ITEM	0.0 0
F.	THE NEWER MODELS ARE SO MUCH BETTER NO ONE WOULD WANT THE OLD ONE	0.0 0
G.	IT WAS GOOD ENOUGH TO TRADE IN	0.0 0
H.	I WANTED TO GET RID OF IT RIGHT AWAY	0.0 0
I.	I USUALLY GIVE THIS TYPE OF THING TO A CHARITY	0.0 0
J.	I KNEW SOMEONE WHO NEEDED IT	10.7 3
K.	I KNEW SOMEONE WHO NEEDED IT AND WAS WILLING TO REPAIR IT	0.0 0
L.	I MIGHT NEED IT AGAIN SOMEDAY	7.1 2
M.	I MIGHT BE ABLE TO FIX IT LATER	0.0 0
N.	I NEVER GET RID OF ANYTHING	0.0 0
O.	SECOND HAND STORES NEVER GIVE YOU WHAT IT'S WORTH	0.0 0
P.	NO CONVENIENT SECOND HAND STORES	0.0 0

NOW, GO TO NEXT ALTERNATIVE DISPOSITION CHECKED OR SKIP TO Q21 IF NO OTHER DISPOSITIONS ARE CHECKED

☐ 18. What are the most important reasons why you didn't donate your _____ to charity?

		n
A.	THEY WOULDN'T PICK IT UP	0.0 0
B.	THEY WOULDN'T SAY WHAT TIME THEY'D PICK IT UP -- I COULDN'T WAIT AROUND ALL DAY FOR THEM	3.9 2
C.	TOO MUCH TROUBLE	15.7 8
D.	I MEANT TO DROP IT IN ONE OF THOSE BINS BUT KEPT FORGETTING	13.7 7
E.	I WAS ANXIOUS TO GET RID OF IT (SO THREW IT AWAY)	3.9 2
F.	IT WAS TOO FAR GONE TO BE REPAIRED	3.9 2
G.	I DIDN'T THINK THEY WOULD BE ABLE TO REPAIR IT	2.0 1
H.	I DIDN'T THINK THEY WOULD BE ABLE TO SELL IT	2.0 1
I.	NOT OF ENOUGH VALUE TO MAKE ANY DIFFERENCE IN MY TAXES	0.0 0
J.	A FRIEND WANTED/NEEDED IT	13.7 7
K.	A RELATIVE WANTED/NEEDED IT	11.8 6
L.	I WAS ABLE TO TRADE IT IN ON A NEW ONE	2.0 1
M.	THIS IS THE TYPE OF THING I LIKE TO SAVE FOR GARAGE SALES	5.9 3
N.	THIS IS THE TYPE OF THING I LIKE TO SELL AT SWAP MEETS	0.0 0
O.	I THOUGHT I COULD GET SOME MONEY FOR IT	2.0 1
P.	I MIGHT TRY TO REPAIR IT SOMEDAY	3.9 2
Q.	I MIGHT NEED IT SOME DAY	7.8 4
R.	I NEVER GIVE ANYTHING AWAY	0.0 0

NOW, GO TO NEXT ALTERNATIVE DISPOSITION CHECKED OR SKIP TO Q21 IF NO OTHER DISPOSITIONS ARE CHECKED

☐ 19. What are the most important reasons why you didn't give your _____ away?

		n
A.	DIDN'T KNOW ANYONE WHO WOULD BE WILLING TO REPAIR IT... 9.1	3
B.	DIDN'T KNOW ANYONE WHO WANTED IT.....48.5	16
C.	I MIGHT WANT IT MYSELF SOMEDAY..... 9.1	3
D.	I PREFER TO GIVE STUFF TO CHARITIES..... 6.1	2
E.	I PREFER TO SELL THIS TYPE OF THING AT SWAP MEETS/ GARAGE SALES..... 3.0	1
F.	EVERYONE I KNOW HAS ONE..... 0.0	0
G.	IT WASN'T WORTH ANYTHING..... 0.0	0
H.	I WANTED TO GET SOME MONEY FOR IT.....12.1	4
I.	I TRADED IT IN ON A NEW ONE..... 0.0	0
J.	IT WAS SO OLD (BROKEN) IT WOULD HAVE SEEMED SILLY TO OFFER IT TO SOMEONE..... 0.0	0
K.	I NEVER GIVE ANYTHING AWAY..... 0.0	0

NOW, GO TO NEXT ALTERNATIVE DISPOSITION CHECKED OR SKIP TO Q21 IF NO OTHER DISPOSITIONS ARE CHECKED

☐ 20. What are the most important reasons why you didn't trade in your _____?

		n
A.	I DIDN'T WANT A NEW ONE.....25.0	2
B.	NEVER OCCURED TO ME.....12.5	1
C.	IT WAS REALLY OLD.....12.5	1
D.	IT WAS REALLY IN BAD SHAPE.....12.5	1
E.	I ALWAYS GIVE STUFF LIKE THIS TO CHARITY..... 0.0	0
F.	I ALWAYS SELL OLD STUFF AT GARAGE SALES..... 0.0	0
G.	I ALWAYS SELL OLD STUFF AT SWAP MEETS..... 0.0	0
H.	DISCOUNT STORES DON'T TAKE TRADE-INS..... 0.0	0
I.	STORE WHERE I WANTED TO BUY THE NEW ONE DIDN'T TAKE TRADE-INS.....12.5	1
J.	INCONVENIENT..... 0.0	0

21. Now we would like to ask you some questions about the _____.

Approximately when did you obtain the _____? (MO)

MONTH: _____ AND YEAR: _____ (YR)

22. What company made it? _____

23. How did you obtain the _____? Did you:

			n
purchase it	GO TO Q24	56.3	175
was it given to you, or	SKIP TO Q29	39.5	123
did you acquire it in some other way?	SKIP TO Q33	4.2	13

24. Was it new or used when you got it?

			n
NEW	GO TO Q25	90.3	158
USED	SKIP TO Q26	9.7	17

25. Did you consider buying this item used rather than new?

			n
YES, CONSIDERED BUYING USED	ASK A	0.0	0
NO, DID NOT CONSIDER BUYING USED	SKIP TO Q26	100.0	158

A. Why didn't you buy a used one? (PROBE)

_____

_____

_____

_____

_____

26. People consider different things about a product when they are buying it. What is important to one person may not be so important to another. We'd like to know what you considered important when you were buying the _____. (HAND R CARD #26) Would you please use this card and tell me how important each of the following factors were to you personally in your decision to buy this product? (INTERVIEWER: READ A THROUGH I AND CIRCLE CODE FOR R'S ANSWER, THEN ASK "J" BELOW.)

	EXT. IMP.	IMP.	SOMEWHAT IMP.	NOT AT ALL IMP.	DK	n
A. The appearance of the product, how good it looks?	10.2	28.57	28.57	32.0	0.57	311
B. How long you thought the product would last, its durability?	47.42	39.42	4.0	8.0	1.1	311
C. The cost of the product?	25.1	39.42	25.14	9.71	0.57	311
D. The specific terms of the manufacturer's guarantee to repair or replace the product within a certain time period if it did not work right?	20.57	28.0	21.14	28.0	1.71	311
E. Instructions from the manufacturer on how to keep the product in good operating condition?	20.0	33.14	15.42	29.71	1.71	311
F. How easy it would be to have the product repaired if it should break down or not work properly?	23.42	25.71	17.14	31.42	1.71	311
G. Being sure that you could depend on the product's working properly when needed, i.e., how reliable it is?	59.42	30.28	4.0	4.0	2.28	311
H. The product's performance, i.e., how well it does what it is supposed to do?	70.28	27.42	0.57	0.57	1.14	311
I. The manufacturer's reputation for making a good product?	45.14	39.42	6.85	7.42	1.14	311

J. Other than what we just talked about, what other factors were important in your decision to buy this product? (PROBE) (INTERVIEWER: FOR EACH ONE MENTIONED, SHOW CARD #26 AND RECORD IMPORTANCE RATING.)

	0.0	0
	0.0	0

27. About how much did you pay for the _____? $_____

28. Where, if anywhere, did you get information on:

A. How long your (PRODUCT) would last, its durability? (CIRCLE ALL MENTIONED)

	Mentioned	n
CONSUMER REPORTS OR OTHER CONSUMER RATING	4.2	13
ADVERTISING	5.8	18
PERSONAL EXPERIENCE	13.5	42
THE SALES CLERK	2.9	9
FROM A FRIEND OR RELATIVE	7.4	23
OTHER:	6.1	19
SPECIFY: _____		
DIDN'T SEEK/GET ANY INFORMATION ON THIS	19.6	61

B. How reliably it would perform when you needed it? (CIRCLE ALL MENTIONED)

	Mentioned	n
CONSUMER REPORTS OR OTHER CONSUMER RATING	3.9	12
ADVERTISING	5.8	18
PERSONAL EXPERIENCE	14.1	44
THE SALES CLERK	2.9	9
FROM A FRIEND OR RELATIVE	9.0	28
OTHER:	6.1	19
SPECIFY: _____		
DIDN'T SEEK/GET INFORMATION	16.1	50

NOW, SKIP TO Q33

BEGIN CARD 4

29. Were you given a new or used _____ ?

		n
NEW	69.1	85
USED	30.9	38
DON'T KNOW/REMEMBER	0.0	0

30. Did they discuss the item with you before giving it to you?

		n
YES	25.2	31
NO	72.4	89
DON'T REMEMBER	2.4	3

31. Did the fact that you were given the _____ make any difference in what you did with it?

		n
YES	14.6	18
NO	81.3	100
NEVER THOUGHT ABOUT IT	4.1	5

32. Do you know about how much they paid for the _____?

PAID $_____

DON'T KNOW .....

33. At the time you obtained the item, how would you say its purchase price compared with that of most other brands/models on the market? Would you say its price was:

		n
way above	3.2	10
slightly above	13.18	41
about the same	45.01	140
slightly below, or	12.21	38
way below the costs of the other brands/models?	5.78	18
DON'T KNOW	20.57	64

34. Similarly, how would you say that the quality of this _____ compared to the quality of most other makes/models available then. Would you say its quality was:

		n
much higher	14.1	44
somewhat higher	22.2	69
about the same	42.8	133
somewhat lower	5.5	17
much lower than the quality of other brands/models?	1.0	3
DON'T KNOW	14.5	45

35. Including your use and that of others in this household, how many times/hours a week was the _____ used?

TIMES A WEEK: _____

HOURS A WEEK: _____

OTHER: _____

A. Including yourself, how many people used the _____ in an average week?

RECORD #: _____

36. When you first got your _____, how many years of use did you expect from it?

NUMBER OF YEARS: _____

37. Were you satisfied with how much use you got out of it?

		n
YES	79.3	242
NO	20.7	63

38. Did you have your _____ repaired at any time?

		n
YES ..... ASK A & B	18.0	56
NO..... SKIP TO Q39.....	82.0	255
DON'T KNOW/REMEMBER..SKIP TO Q39.	0.0	0

A. How many times did you have it repaired?

TIMES REPAIRED: _____

B. (How many of these times)/Did you repair it yourself?

(1) ONLY ONE REPAIR, THIS DONE BY R: YES _____ NO _____

(2+) MORE THAN ONE REPAIR, ENTER NUMBER OF THESE DONE BY R:_____

39. Did the product need repair at the time you _____ it?

		n
YES..... ASK A & B	53.7	167
NO ..... SKIP TO Q40.....	45.3	141
DON'T KNOW/REMEMBER..SKIP TO Q40.	1.0	3

A. Did you know what was causing it not to work or operate properly? For example, did you know what part was broken or defective, what wire was loose or burned out, or something else like that?

		n
YES.....	50.9	85
NO.....	49.1	82
DON'T KNOW/REMEMBER	0.0	0

FIRST MOST IMPORTANT REASON FOR NOT REPAIRING

B. What made you decide not to have your _____ repaired? (CIRCLE ALL MENTIONED)

			n
A.	HAD PREVIOUS BAD EXPERIENCES WITH REPAIR SHOPS.....	1.2	2
B.	TOO BUSY, INCONVENIENT TO GET TO REPAIR SHOP.....	14.4	24
C.	TOO OLD TO REPAIR.....	13.2	22
D.	REPAIRED SEVERAL TIMES BEFORE.....	2.4	4
E.	DAMAGED BEYOND REPAIR.....	13.2	22
F.	WOULDN'T BE WORK MUCH EVEN IF REPAIRED (THEREFORE NOT GIVEN TO SALVATION ARMY, ETC.).....	2.4	4
G.	COULDN'T BE REPAIRED AT REASONABLE PRICE.....	24.6	41
H.	NEW MODEL SO MUCH BETTER THAT THE OLD ONE WASN'T WORTH REPAIRING.....	9.6	16
I.	WOULD TAKE TOO MUCH TIME TO REPAIR THE OLD ONE.....	5.4	9
J.	OTHER.....	13.8	23

SPECIFY: _____

40. When you first obtained the product, did it include operating and maintenance instructions?

		n
YES ..... ASK A & B	74.6	232
NO ..... SKIP TO Q41	16.7	52
DON'T KNOW/REMEMBER..SKIP TO Q41.	8.7	27

A. Were these instructions printed in a separate pamphlet or attached in some way to the product itself?

		n
SEPARATE	81.03	188
ATTACHED	4.31	10
BOTH	3.87	9
DON'T KNOW/REMEMBER	10.77	25

B. Did you manage to keep track of these?

		n
YES ..... ASK C & D	59.05	137
NO ..... SKIP TO Q41	36.20	84
DON'T KNOW/REMEMBER..SKIP TO Q41.	4.74	11

C. Did you generally follow the operating instructions for the product?

		n
YES	96.35	132
NO	2.18	3
DON'T KNOW/REMEMBER	1.45	2

D. Did you follow a regular schedule of maintenance (if one was recommended)?

		n
YES	47.10	57
NO	40.49	49
DON'T KNOW/REMEMBER	12.39	15

CARD 4

41. Now I would like you to read some statements about small electrical products and how people use them. Please give the answer that best describes what you think about each of the statements. Indicate your answer by putting an "X" in the appropriate box.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO OPINION
1. I always look for durable products.	49.5	46.9	3.2	0.3	0.0
2. I often donate items to charity.	17.4	52.4	26.0	2.6	1.6
3. If a product costing less than $40 breaks down on me, I'm likely to discard it without too much hesitation.	4.2	21.8	51.0	20.8	2.3
4. I feel a responsibility to have a product repaired rather than replaced when-ever feasible.	22.0	57.0	15.1	2.3	3.6
I get tired of some products after a few years.	4.2	28.7	47.1	16.8	3.2
I look for products with good warranties.	31.3	52.6	14.5	0.3	1.3
expect most products wear out someday.	27.0	66.2	6.1	0.0	0.6
am a "pack rat".	15.8	28.9	43.1	11.9	0.3
els on products should ore informative.	29.0	46.1	20.3	0.6	3.9
more products than d.	3.9	16.7	61.1	17.4	1.0
n sell old products age sales, swap etc.	1.6	14.5	58.8	24.1	1.0
ity of repair is better today ears ago.	2.4	14.1	39.7	16.2	27.6
keep old ntil I move - w or give	5.5	36.3	46.3	7.1	4.8

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO OPINION
14. In general, I make wise purchase decisions.	16.8	76.1	4.8	0.6	1.6
15. Consumers are more quality conscious today than 10 years ago.	19.0	49.4	22.3	2.9	6.5
16. Products should be made in such a way that they can be easily repaired.	48.4	49.0	1.3	0.3	1.0
17. I like to have "the latest thing" in appliances.	2.9	22.5	59.5	10.9	4.2
18. You can't trust most repair shops.	8.2	32.6	40.5	0.7	18.1
19. I don't take care of products the way I should.	1.3	16.4	69.1	11.9	1.3
20. Some products are just not worth repairing.	10.0	69.8	14.1	2.3	3.9
21. Most large manufacturers need a "director of consumer affairs" to ensure a consumer orientation in product design.	25.2	58.9	8.4	0.3	7.1
22. I rely on seals of approval like Good Housekeeping to help me choose products.	7.1	38.4	42.6	7.7	4.2
23. The repair industry should be regulated by the government.	7.8	26.7	41.0	11.1	13.4
24. Once something on a product breaks, you might as well throw it away.	1.3	14.3	67.4	13.0	3.9
25. In general, the repair industry is a "rip-off".	6.8	28.0	46.9	2.6	15.6
26. Products aren't built as well as they used to be.	26.5	48.4	17.6	0.3	7.2
27. There are more product style changes today than there were 10 years ago.	20.9	63.1	7.8	0.7	7.5

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO OPINION
28. I read product labels and instruction booklets carefully.	23.9	62.6	12.2	0.3	1.0
29. I sometimes replace a perfectly useable product with one that is more stylish.	0.3	7.4	63.0	28.3	1.0
30. I usually try to repair a product when it breaks down.	13.4	67.8	15.0	1.3	2.6
31. I refer to Consumer Reports or other consumer rating services before making an important purchase.	17.7	43.5	32.9	3.2	2.6
32. Today's products are vast improvements over products of the past.	3.6	40.6	36.6	6.3	12.9
33. I don't pay much attention to the use and care booklets that come with products.	0.0	14.2	65.8	19.4	0.6
34. Products break down too soon these days.	10.1	44.8	36.7	0.6	7.8
35. Style changes in products are unimportant.	9.3	53.4	33.1	1.3	2.9
36. Manufacturers design products to wear out in a few years.	16.1	49.4	23.9	1.0	9.7
37. I always buy "new" rather than "used".	16.5	54.4	22.3	4.2	2.6
38. I never throw away a product.	5.2	28.8	58.9	4.5	2.6
39. Donating products to charity is a good income tax deduction.	3.5	45.5	32.9	5.2	12.9
40. If a product costing less than $20 breaks down on me, I'm likely to discard it without too much hesitation.	5.2	44.2	42.6	5.8	2.3

BEGIN CARD 5

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO OPINION
41. Products are built so cheaply today that they are meant to be thrown out rather than repaired.	8.5	41.4	37.8	2.0	10.4
42. Consumers are more price conscious today than 10 years ago.	13.5	51.9	26.5	1.9	6.1
43. Getting an item repaired is usually very inconvenient.	18.6	54.0	20.9	1.3	5.1
44. I like modern, stylish products.	1.3	44.0	43.4	4.2	7.1
45. It takes too long to have a product repaired.	7.5	44.4	33.3	1.3	13.4
46. I often give away old products to relatives or friends.	9.0	39.2	45.3	3.5	2.9
47. Too many products are built in such a way that they can't be easily repaired.	10.4	60.4	18.5	0.3	10.4
48. I am often disappointed with the durability of products I buy.	11.9	44.2	39.4	1.9	2.6
49. It is often cheaper to buy a new product than to have an old one repaired.	11.6	58.1	20.6	1.6	8.1
50. I am convenience-oriented.	8.7	60.5	25.9	2.3	2.6
51. I like to fix things.	9.4	38.5	39.5	11.7	1.0
52. I always look for the "best buy for the money".	25.5	64.5	9.4	0.0	0.6
53. Often a product is "old-fashioned before it's worn out.	5.8	46.3	39.2	3.6	5.2
54. My personal financial situation is in pretty good shape.	6.5	77.1	10.0	2.6	3.9

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	NO OPINION
55. Today greater attention is devoted by manufacturers to performance standards and product durability.	2.0	33.7	44.6	5.6	14.2
56. My time is extremely valuable to me.	31.2	57.6	10.6	0.0	0.6
57. I often keep old appliances around the house rather than get rid of them.	5.8	45.5	40.6	5.8	2.3
58. Advertisements should be more informative.	12.7	65.3	15.6	0.6	5.8
59. It is too expensive to get many smaller products repaired.	12.5	63.9	12.8	0.7	10.2
60. If a product costing less than $60 breaks down on me, I'm likely to discard it without too much hesitation.	1.6	6.4	64.3	25.7	1.9
61. It is really hard to get a product repaired these days.	5.6	42.6	37.0	1.0	13.8
62. You have to pay more for a durable product.	10.7	68.6	17.2	1.0	2.6
63. I sometimes replace a product even though it is still useful.	1.3	24.5	60.6	13.2	0.3
64. I often buy less expensive products so that I can throw them away without feeling guilty.	0.6	5.8	66.7	25.6	1.3
65. I would gladly pay more for more durable products.	13.6	70.6	11.7	1.3	2.9

42. Now I would like to ask you a few questions about disposal of non-electrical items. First, how satisfied are you with the present performance of municipal refuse collection by the City of Santa Monica? Would you say it is:

		n
very adequate	41.5	129
adequate, or	47.6	148
inadequate?	4.5	14
DON'T KNOW/NO OPINION	6.4	20

43. Would you favor limiting refuse collection to only once a week rather than increasing the cost in order to continue the current level of service?

FAVOR ONCE A WEEK COLLECTION.....
INCREASE COSTS/KEEP CURRENT SERVICE.
OTHER.....
SPECIFY:_____
DON'T KNOW/NO OPINION.....

44. If the city had a recycling program, would you be willing to separate paper, glass, and metal trash in different refuse containers at your home?

YES, DEFINITELY..ASK A.....
YES, QUALIFIED..ASK A.....
NO, DEFINITELY..SKIP TO Q45.....
DON'T KNOW/NO OPINION..SKIP TO Q45..

A. Which of the following item would you be willing to keep in separate refuse containers.

	YES	NO
Newspapers?		
Cardboard?		
Glass?		
Aluminum?		

45. We are interested in how people are getting along financially these days. The next set of questions concerns economic matters. Would you say that you and your family are better off or worse off financially than you were a year ago?

		n
BETTER NOW	47.3	147
SAME	25.4	79
WORSE NOW	26.4	82
UNCERTAIN, DON'T KNOW	1.0	3

46. Now looking ahead--do you think that a year from now you and your family will be better off financially, or worse off, or just about the same as now?

		n
BETTER	44.7	139
SAME	39.9	124
WORSE	9.6	30
UNCERTAIN, DON'T KNOW	5.8	18

47. Now turning to business conditions in the country as a whole--do you think that during the next twelve months we'll have good times financially, or bad times, or what?

		n
GOOD TIMES	27.0	84
GOOD, WITH QUALIFICATIONS	15.1	47
PRO-CON (GOOD AND BAD)	17.7	55
BAD, WITH QUALIFICATIONS	9.0	28
BAD TIMES	18.6	58
UNCERTAIN, DON'T KNOW	10.3	32

48. Looking ahead, which would you say is more likely--that in the country as a whole we'll have continuous good times during the next five years or so, or that we'll have a period of widespread unemployment or depression, or what?

		n
CONTINUOUS GOOD TIMES	31.2	97
PRO-CON (GOOD AND BAD)	19.9	62
UNEMPLOYMENT/DEPRESSION	26.7	83
OTHER	5.1	16
SPECIFY: _____		
UNCERTAIN, DON'T KNOW	17.0	53

49. Now, about the big things people buy for their homes--such as furniture, house furnishings, refrigerator, stove, television, and things like that. Generally speaking, do you think now is a good or bad time for people to buy major household items?

		n
GOOD	57.75	175
PRO-CON (GOOD AND BAD)	7.90	24
BAD	17.49	53
UNCERTAIN, DON'T KNOW	16.85	51

50. Now, before I leave, I would like to get some background information on you and your family. Including yourself, how many persons live here regularly as members of this household? (Do not include students living away from home at school, persons away in the armed forces, persons away for an extended time period such as for medical or employment reasons)

RECORD NUMBER: _____

51. What is your age?

RECORD AGE: _____

52. What is your current marital status? Are you:

		n
married	60.1	187
separated	2.3	7
divorced	9.0	28
widowed, or	7.7	24
have you never been married?	20.3	63
OTHER	0.6	2
SPECIFY: _____		

53. (SHOW CARD #53) Would you look at this card and give me the number of the group that best describes your ethnic or racial background?

		n
WHITE/CAUCASIAN	89.0	275
BLACK/NEGRO/AFRO-AMERICAN	3.9	12
MEXICAN/MEXICAN-AMERICAN	2.3	7
LATIN AMERICAN	0.6	2
ASIAN/ASIAN-AMERICAN	2.3	7
AMERICAN INDIAN/NATIVE AMERICAN	0.3	1
OTHER	1.6	5

SPECIFY:_____

54. What was the highest grade in school you completed?

00	01	02	03	04	05	06	07	08	09	10	11	12
0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.0	0.3	1.3	1.6	23.5

COLLEGE/OTHER POST HIGH SCHOOL SCHOOLING	13	14	15	16
	9.0	14.2	8.7	21.0

POST GRADUATE SCHOOL	17	18	19	20 OR MORE:
	4.8	6.8	1.9	4.8

55. What is your current employment status? Are you:

		n
working full-time	SKIP TO Q56 — 36.0	172
working part-time	SKIP TO Q56 — 10.9	34
unemployed	ASK A — 9.6	30
retired	SKIP TO Q56 — 15.8	49
keeping house	ASK A — 21.5	67
in school	ASK A — 4.8	15
something else?	ASK A — 1.3	4

specify:_____

A. Have you ever been employed?

		n
YES	ASK Q56 — 89.7	104
NO	SKIP TO Q57 — 10.3	12

56. What (is)/(was) your usual occupation, that is, what kind of work (do)/(did) you do? PROBE IF VAGUE: What do/did you actually do on the job?

		n
PROF'AL, TECH	39.9	119
MGRS, OFFCLS	11.4	34
SALES	4.4	13
CLERICAL	27.5	82
CRAFTS, SKILLED	4.4	13
SEMI-SKILLED	1.7	5
UNSKILLED	0.3	1
SERVICE WKRS	9.7	29
DOMSTC WKRS	0.3	1

57. Including salaries, wages, dividends, interest, pensions, and other forms of income, was your/your family's total 1976 income before taxes under or over $10,000?

		n
UNDER	USE INCOME CARD A FOR Q58 — 21.9	68
OVER	USE INCOME CARD B FOR Q58 — 70.1	218
REFUSED	SKIP TO Q59 — 4.2	13
DK/NA	SKIP TO Q59 — 3.9	12

58. (SHOW APPROPRIATE INCOME CARD) Would you please look at the Income Card and give me the number of the group that includes your/your family's total income before taxes last year (1976)?

RECORD NUMBER:_____
REFUSED.....
DK/NA.....

A. Including yourself, how many people were dependent on this income last year (1976)?

RECORD NUMBER OF PEOPLE DEPENDENT:_____

59. Do you own or rent this place?

		n
OWN.....	46.9	146
RENT.....	52.1	162
OTHER.....	1.0	3
SPECIFY:_____		

60. This is the end of the interview. We appreciate your taking the time to participate in this study. Before I leave, is there anything else you would like to say about the topics we've covered in the interview?

61. May I verify your telephone number in case my office wants to check that I was here to do this interview? (VERIFY NUMBER APPEARING INSIDE FRONT PAGE. ENTER THIS NUMBER OR CORRECTED/ADDITIONAL NUMBERS BELOW.)

ORIGINAL NUMBER:_____

ANY ADDITIONAL NUMBER(S):_____

_____

ENTER END TIME:

Respondent's Name:_____

Interviewer's Name:_____

Date Completed:_____

COMPLETE ITEMS ON PAGE 25 AFTER LEAVING HOUSEHOLD

FILL IN THE FOLLOWING ITEMS IMMEDIATELY AFTER LEAVING RESPONDENT'S HOME.

			n
A.	Respondent was:	MALE.....28.0	87
		FEMALE.....72.0	224
			n
B.	Respondent was:	BLACK, NON-SPANISH SURNAME..... 3.9	12
		SPANISH SURNAME..... 2.3	7
		ORIENTAL..... 2.3	7
		NON-SPANISH SURNAME (NOT BLACK OR ORIENTAL).....90.9	281
		OTHER..... 0.6	2
		SPECIFY:_____	
			n
C.	Housing Type:	SINGLE FAMILY RESIDENCE.....52.1	162
		DUPLEX..... 2.9	9
		APT. BLDG. (UNDER 20 UNITS).....33.1	103
		APT. BLDG. (20 UNITS OR MORE)....10.9	34
		MOBILE HOME..... 0.0	0
		OTHER..... 1.0	3
		SPECIFY:_____	
D.	Sex of Interviewer:	MALE.....	
		FEMALE.....	

E. Interest of Respondent during interview:

		n
	VERY INTERESTED.....67.8	211
	SOMEWHAT INTERESTED.....30.5	95
	UNINTERESTED..... 1.6	5

F. Enter total time of interview in minutes:

NUMBER MINUTES:_____

OFFICE USE ONLY

G. Census tract number:_____

H. Region number:_____

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APPENDIX D (TABLE D.1)

DISPOSAL OPTION BY PRODUCT TYPE
FOR "OTHER" CATEGORY*

Appliance	Percent of products: Sold	Donated	Given away	Traded-in	n
Toaster	3	14	28	0	35
Toaster oven	0	27	27	10	11
Mixer	10	14	24	0	21
Can opener	0	15	9	0	33
Coffee maker	6	6	6	0	16
Blender	0	17	5	5	23
Skillet	0	20	30	0	10
Blow dryer	7	0	7	2	41
Bonnet hairdryer	5	9	9	0	21
Elec. toothbrush	0	0	40	0	5
Vacuum cleaner	23	12	26	6	29
Iron	6	12	12	0	16
Television (B&W)	10	7	35	7	34
Radio	6	6	13	0	16

* Breakdown of "other" category in table 2.4.1

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APPENDIX E

USING PSYCHOGRAPHIC VARIABLES TO INVESTIGATE PRODUCT DISPOSITION BEHAVIORS *

Marian Burke, University of California, Los Angeles
W. David Conn, University of California, Los Angeles
Richard J. Lutz, University of California, Los Angeles

ABSTRACT

Consumer researchers and public policy makers have begun to show interest in understanding a range of consumer behaviors: purchase, information search, consumption, and disposition. This study of product disposition behaviors found that a number of psychographic and demographic variables were significant, but weak, discriminators among groups of consumers engaging in a variety of disposition behaviors. The study thus adds to a small base of descriptive information which will help to move toward an understanding of product disposition.[1]

INTRODUCTION

Models of consumer behavior [e.g., 9, 14] have traditionally focused primarily on acquisition behavior. While some attention has been given to the consumer's use and evaluation of products, product disposition behavior has been largely ignored. Only recently has interest focused on the consumer processes involved in the decision of how to dispose of a product whose useful life, with respect to its original purpose, has ended [15]. The effects of disposition choice on the environment -- the long-run effects of a throwaway lifestyle, the resources wasted when an item is discarded, and the resources depleted when it is replaced -- dictate that the specifics of disposition behavior be studied as completely as has purchase behavior.

During the past ten years concern for and interest in the environment has grown and has even become institutionalized, as demands for quality of life as well as quantity have begun to be answered. The adverse effects of increasing production and consumption have been noticed -- environmental degradation, resource depletion, and the problem of handling increasing amounts of solid waste. The associated social costs are often neglected by the manufacturers and the consumer since many of these costs are not accommodated by the traditional economic system in the short-run. Therefore, this area has become the domain of public policy makers. As a means of alleviating all three problems cited above, the government is examining the possibility of reducing the rate at which solid waste is generated. One approach is to extend the lifetimes of durable products, thereby reducing discards and the need to supply replacements [22]. This approach must be applied with care since the manufacture, use, and disposal of more durable products could, under certain circumstances, entail a higher rather than lower intensity of materials and energy use [7]; nevertheless, in most cases it seems likely that extending product lifetimes would indeed serve the desired objectives.

Existing product lifetimes are affected by a number of forces, including decisions made by manufacturers (e.g., durability, repairability) and decisions made by consumers (e.g., replacement with a more stylish product, the decision to repair, proper care and maintenance of the product). An understanding of consumers' disposition behavior is necessary before the government can expect to modify that behavior by sanctions imposed on either the consumer or business. For instance, there is no reason to persuade or force manufacturers to make products last longer if, in reality, consumers discard products before they reach the technical limits of their durability. Therefore, it is critical that public policy makers adopt a consumer orientation in their efforts to assist consumers in the marketplace. A normative approach to deciding what is appropriate for consumers is largely doomed to failure; instead, policy makers must begin to use modern consumer research technology to gain an adequate understanding of the consumer behaviors they wish to modify. The purpose of the present paper is to report the results of an exploratory study which utilized established market segmentation procedures (e.g., psychographics, multivariate statistical analysis) to investigate consumers' product disposition behaviors.

Literature Related to Disposition

Most of the past empirical work on disposition behavior has been involved with socially responsible disposition rather than a more complete spectrum of disposal alternatives. Several studies have been reported whose purpose has been to identify what has come to be known as the socially conscious or ecologically concerned consumer [2, 5, 16, 17, 19, 24]. While the main focus of these efforts has been on discovering potential market segments for products or ideas that promote social or environmental well-being, often the measures used have been related to recycling, a form of disposition behavior. Some of these studies dealt with consumers' concern for the environment as reflected in behavior, but the products involved have been those which are physically consumed during use, e.g., gasoline or detergent, and any environmental deterioration is the result of the use of the product rather than the method of disposal. In all of these studies psychographic measures have served as better predictor variables than have demographic or socioeconomic variables.

Another trickle of literature which is related to disposition involves the issues surrounding disposable packaging [8, 13, 18, 23]. Throwaway packages are, of course, meant to be thrown away, so the concern has been the the method of disposal (the litter problem) rather than with the fact that an individual chooses to discard the item.

Jacoby, Berning, and Dietvorst [15], noting the lack of empirical studies regarding disposition behavior, conducted an exploratory survey to determine the methods of disposal used for a variety of consumer products (toothbrush, stereo amplifier, record, wrist watch, bicycle, and refrigerator). They explored a three-part taxonomy of possible disposition behaviors -- keep the product, permanently dispose of it, or temporarily dispose of it -- which they found to be useful in categorizing disposition. They suggested important directions for future research, including gathering additional descriptive information, followed by a search for explanations of why certain patterns exist, and finally attempts at predicting and changing disposition behavior. The latter is clearly of interest to those concerned with increasing the value of products to consumers and those concerned with the conservation ethic.

[1]The research reported here was supported by the National Science Foundation under Grant No. APR76-19350. Any opinions stated herein are those of the authors alone and do not reflect an official view of the National Science Foundation or of the University of California.

*This paper was presented at the 1978 Educators' Conference, American Marketing Association

The explanation of disposition behavior can be approached using many of the same concepts as are used to study acquisition behavior; for instance, individuals who choose a particular method of disposition can be viewed as segments. The first task in segmentation is to identify dimensions which distinguish the segments, i.e., to develop profiles of the individuals who comprise the segments. The purpose of this research is to attempt to discover variables which will distinguish among individuals who choose different means of disposing of small electric appliances.

PROCEDURE

The study reported here is based on a survey funded by the National Science Foundation for the purposes of investigating factors which influence the length of "product lifetimes." Interviews with leading manufacturers of small electric appliances regarding their actions in the areas of durability, repairability, and so forth were another essential part of the total research design, but the focus here will be on selected results of the consumer survey only.

Sampling Frame

In-home interviews were conducted by professional interviewers with 311 residents of the city of Santa Monica, California during the summer of 1977. An initial stratified random sample of 3,291 Santa Monica residents was conducted by telephone and administered a screening questionnaire. Of those who were considered eligible for the study, 311 agreed to and successfully completed the in-home interviews. To be eligible some member of the household had to have disposed of one of the selected appliances within the previous twelve month period. The household member who disposed of the product was the individual interviewed.

Product Mix

The study was limited to disposal behavior with respect to a selected list of small electric appliances. Small electric appliances were chosen because they tend to be discarded before their useful life is exhausted and to some extent are becoming non-durables since their repair is expensive vis-a-vis their purchase price [12]. The product list was designed to include appliances characterized by rapid technological innovation (e.g., toaster ovens), those for which stylistic innovation is rapid (e.g., hair dryers), those that could be considered fads (e.g., electric toothbrushes), and those considered "stable" (e.g., vacuum cleaners). Product selection was also guided to some extent by the interests of the sponsoring agency, focus group discussions, and by suggestions from the project's industrial consultant. The final list included toaster, toaster oven, electric mixer, blender, electric toothbrush, vaccum cleaner, electric frying pan, bonnet-type hair dryer, handheld hairdryer, radio, portable black-and-white television, and iron.

Dependent Variable

A verbal report of disposition choice served as the dependent variable. Disposal was operationalized as the action taken by a household unit when it no longer intended to use an appliance for its original purpose. The six disposal options included in the study were 1) discard the product, 2) sell it, 3) donate the item to charity, 4) give it to a friend or relative, 5) trade it in on a newer model, or 6) store the product.

Independent Variables

The independent variables used to develop the profiles consisted of a standard set of demographic variables (age, marital status, education, occupation, and family income) and a set of lifestyle or psychographic variables developed expressly for this study. Wells [25] has recently reviewed the use of psychographics in marketing noting that this method of describing consumers adds richness to commonly used demographic profiles. Sixty-five Likert-type statements related to individuals' activities, interests, and opinions with respect to the issues at hand were drawn from a review of the literature of consumers' opinions on matters such as product durability, the repair industry, and the like [1, 3, 4], and from statements made by participants in three focus groups conducted during the exploratory phase of this project. Since the lifestyle statements were chosen to represent dimensions that might be related to disposition behavior, this particular application of lifestyle research conforms to what Wells [25] labeled a "product-specific psychographic profile" study.

The psychographic portion of the interview was self-administered. Respondents were asked to consider each of the Likert-type statements with respect to small electric appliances and to indicate their level of agreement with the statements (1 = Strongly Disagree to 5 = Strongly Agree).

Data Analysis

Data analysis was conducted in two stages: 1) a factor analysis of the psychographic statements to reduce the data; and 2) a discriminant analysis, the purpose of which was to identify variables which distinguish among respondents' disposal choices. The factors which emerged in the first stage were used to generate factor scores which served as independent variables in the discriminant analysis, both separately and in combination with demographic variables.

RESULTS AND DISCUSSION

Factor Analysis

In the first stage of the analysis, the 65 lifestyle variables were factor analyzed via principal components analysis. Results of this initial analysis indicated a fairly unstable factor structure, which was caused in part by several variables with extremely low variability. Accordingly, all variables which did not load at .35 or greater on any single factor were eliminated and a new principal components analysis using the remaining 50 lifestyle variables was conducted. An eight factor solution resulted which accounted for 44.4 percent of the variance. Only seven of those factors were interpretable and had a reasonable number of loadings with absolute values greater than .35 [6, 26]. The eighth factor, as suggested by Comrey [6], was retained to capture error variance, rather than spreading it over the seven "real" factors. The first seven factors, their eigenvalues, and associated amounts of explained variance (total and common) are shown in Table 1. Only variables with loadings of .35 or more are reported in the table, although all of the variables were used in computing the factor scores.

TABLE 1
FACTOR LOADINGS OF THE LIFESTYLE STATEMENTS

Variable	Factor 1 Cynics
Products break down too soon these days	.719
Products are built so cheaply today that they are meant to be thrown out rather than repaired.	.595
Today greater attention is devoted by manufacturers to performance standards and durability.	-.593
Products aren't built like they used to be.	.592

TABLE 1 (continued)

Variable	Factor 1 Cynics
I am often disappointed with the durability of products I buy.	.541
Too many products are built in such a way that they can't be easily repaired.	.529
Today's products are vast improvements over products of the past.	-.461
EIGENVALUE	5.78
COMMON VARIANCE EXPLAINED*	26.0%
TOTAL VARIANCE EXPLAINED	11.6%

Variable	Factor 2 Hedonists
I like to have "the latest thing" in appliances.	.602
I like modern, stylish things.	.580
I sometimes replace a perfectly useable product with one that is more stylish.	.486
I sometimes replace a product even though it is still useful.	.473
Style changes in products are unimportant.	-.467
I am convenience oriented.	.400
EIGENVALUE	4.75
COMMON VARIANCE EXPLAINED	21.4%
TOTAL VARIANCE EXPLAINED	9.5%

Variable	Factor 3 Careless
I don't pay much attention to the use and care booklets that come with products.	.608
I read product labels and instruction booklets carefully.	-.596
I don't take care of products the way I should.	.459
I look for products with good warranties.	-.452
In general, I make wise purchase decisions.	-.409
EIGENVALUE	2.70
COMMON VARIANCE EXPLAINED	12.2%
TOTAL VARIANCE EXPLAINED	5.4%

Variable	Factor 4 Trashers
If a product costing less than $40 breaks down I'm likely to discard it without much hesitation.	.694
If a product costing less than $60 breaks down I'm likely to discard it without much hesitation.	.596
If a product costing less than $20 breaks down I'm likely to discard it without much hesitation.	.594
Once something on a product breaks, you might as well throw it away.	.491
I feel a responsibility to have a product repaired rather than replaced whenever feasible.	-.390
I often buy less expensive products so that I can throw them away without feeling guilty.	.370
It is often cheaper to buy a new product than to have an old one repaired.	.350
EIGENVALUE	2.42
COMMON VARIANCE EXPLAINED	10.9%
TOTAL VARIANCE EXPLAINED	4.8%

Variable	Factor 5 Anti-Rpr.
It takes too long to have a product repaired.	.705

*Factor 8, which was discarded, accounts for the remaining 6.6 percent of the common variance.

TABLE 1 (continued)

Variable	Factor 5 Anti-Rpr.
It is really hard to get a product repaired these days.	.613
Getting an item repaired is usually very inconvenient.	.514
The repair industry is a "rip-off."	.502
It is too expensive to get many smaller products repaired.	.430
You can't trust most repair shops.	.414
EIGENVALUE	1.81
COMMON VARIANCE EXPLAINED	8.1%
TOTAL VARIANCE EXPLAINED	3.6%

Variable	Factor 6 Pack Rats
I am a "pack rat."	.523
I often keep old appliances around the house rather than get rid of them.	.462
I often give away old products to relatives or friends.	.420
I like to fix things.	.400
I tend to keep old products until I move - then I throw or give them away.	.364
I always buy "new" rather than "used."	-.350
EIGENVALUE	1.66
COMMON VARIANCE EXPLAINED	7.5%
TOTAL VARIANCE EXPLAINED	3.3%

Variable	Factor 7 Consumerists
Consumers are more price conscious today than ten years ago.	.508
Labels on products should be more informative.	.459
Advertisements should be more informative.	.394
The repair industry should be regulated.	.349
EIGENVALUE	1.60
COMMON VARIANCE EXPLAINED	7.3%
TOTAL VARIANCE EXPLAINED	3.0%

The first seven factors are summarized as follows:

Factor 1-"Cynics"-An individual who scores high on this factor is skeptical regarding the durability and repairability of small electric appliances and of the motives of manufacturers of such products.

Factor 2-"Hedonists"-A high score on this factor is related to a lifestyle that could be described as "wanting the latest with the least effort ". The Hedonists will replace working products with more stylish ones, are convenience oriented, and buy more products than they need.

Factor 3-"Careless Consumers"-Those who do not put much effort into purchasing or caring for products would score high on this factor.

Factor 4-"Trashers"-This factor reflects a proclivity to discard an appliance as soon as it malfunctions regardless of its purchase price. These individuals do not feel a responsibility to have a product repaired and will buy less expensive products so they can discard them without experiencing guilt.

Factor 5-"Anti-Repairists"-Individuals who score high on this factor feel the repair industry is a "rip off" -- it's inconvenient, expensive, time consuming, and so forth.

Factor 6-"Pack Rats"-A high score on this factor would indicate a tendency <u>not</u> to permanently dispose of old appliances. Instead, the appliances are kept around the house, given away, or perhaps fixed by the individual.

Factor 7-"Consumerists"-Individuals who score high on this

factor endorse many of the concerns of the current consumerism movement, e.g., that labels and advertisements should be more informative, that the repair industry should be regulated, etc. The factor names are, of course, arbitrary and are used as a heuristic rather than as a concrete summarization of a dimension.

Discriminant Analysis

Linear discriminant analysis was used to examine the set of independent variables to see which, if any, could distinguish among the various disposal options.

For the purposes of this analysis the dependent variable, disposition choice, was collapsed in two ways, the first representing more specific behaviors than the second.

1. A four-group taxonomy:
   - Discard the product (no value to anyone); n=65
   - Store the product (some value to the owner); n=128
   - Sell, donate, or trade-in the product (monetary value to the owner); n=62
   - Give the product to a friend or relative (value to someone other than the owner); n=56
2. A two-group taxonomy:
   - Discard the product (no value to anyone); n=65
   - All others (some value to someone); n=246

For each taxonomy above, three separate discriminant analyses were performed. First the lifestyle factor scores served as the independent variables, then the demographic variables, and finally, a combination of both. None of these independent variables was strongly correlated with any other, and all variables were continuous except for marital status which was dummy-coded (married, not married).

Discriminant Functions. Because the sample was carefully drawn to fairly represent the residents of Santa Monica, all of the respondents were used in the development of the discriminant functions to ensure better estimates of the discriminant coefficients [20]. The fact that the disposition groups were not of equal size is not a problem at this stage of the analysis for, as Morrison notes [20], the prior probabilities of group membership affect only the constant term and have no effect on the discriminant coefficients.

The results of the discriminant analyses are shown in Table 2. The independent variables were able to differentiate between the groups only in the second taxonomy presented above.

TABLE 2
F-TEST OF DISCRIMINANT FUNCTIONS

		Eigen Value	Wilks' λ	X^2	DF	P<
Lifestyle Factors	4-GROUP ANALYSIS					
	Function 1	.104	.8652	44.10	21	.002
	Function 2	.032	.9550	13.93	12	.305
	Function 3	.014	.9860	4.32	5	.504
	2-GROUP ANALYSIS					
	Function 1	.050	.9520	14.90	77	.037
Demographics	4-GROUP ANALYSIS					
	Function 1	.033	.9425	18.09	15	.258
	Function 2	.024	.9740	8.043	8	.429
	Function 3	.002	.9971	.87	3	.832
	2-GROUP ANALYSIS					
	Function 1	.028	.9732	8.325	5	.139

TABLE 2 (continued)

		Eigen Value	Wilks' λ	X^2	DF	P<
Combination	4-GROUP ANALYSIS					
	Function 1	.1532	.8023	66.52	36	.001
	Function 2	.0569	.9253	23.46	22	.376
	Function 3	.0225	.9780	6.73	10	.750
	2-GROUP ANALYSIS					
	Function 1	.090	.9174	26.13	12	.010

The discriminant coefficients for the significant functions from the two-group analysis are shown in Table 3. In determining which variables contribute to an explanation of the nature of group differences the common heuristic is to consider those with a standardized coefficient with an absolute value at least as great as one-half the value of the largest standardized coefficient [21]. Applying this rule of thumb to the function containing only the lifestyle factors, Factors 4 (Trashers), 5 (Anti-Repairists), and 6 (Pack Rats) were the most important variables in differentiating between those who discarded products and those who recognized some value in the product. Factor 1 (Cynics) almost met the criterion. Individuals who threw a product away have a predisposition to do so, are not satisfied with the repair industry, and are not inclined to keep things around the house.

TABLE 3
DISCRIMINANT COEFFICIENTS

Independent Variable	LIFESTYLE FACTORS Standardized	LIFESTYLE FACTORS Unstandardized	COMBINATION Standardized	COMBINATION Unstandardized
Factor 1-Cynics	.3091	.3448	.1285	.1434
Factor 2-Hedonists	.0790	.0921	.0773	.0901
Factor 3-Careless Consumers	.1134	.1327	-.0130	-.0152
Factor 4-Trashers	.6403	.7333	.5626	.6444
Factor 5-Anti-Repairists	.3379	.3910	.2143	.2479
Factor 6-Pack Rats	-.5182	-.6299	-.5241	-.6371
Factor 7-Consumerists	.1954	.2471	.0689	.0871
Age	Not Included		.6847	.0419
Marital Status			.0043	.0088
Education Level			.1442	.0538
Occupation			.1343	.0461
Income			.2223	.0350
Constant	0			-3.1747

When the demographic variables were added to the analysis, the Anti-Repairist dimension no longer met the criterion for inclusion and the Cynic dimension no longer even approched importance. One demographic variable, age, seemed to be quite important.

Cross Classification. A useful test of the power of a discriminant function is to test its ability to correctly classify a set of subjects at a level which is greater than chance. A split-sample technique can be used to overcome the upward bias which results when the discriminant coefficients are applied to the sample data which were used to develop the function [11]. Two constraints precluded this approach in this study: 1) it was necessary to use all the respondents to achieve a stable factor solution, and these factors were used to construct the factor score independent

variables; thus any holdout sample would be biased to a degree; and, 2) since the effective sample size in discriminant analysis is the size of the smallest group [20], dividing the already small group of individuals who discarded products would have introduced the chance of not capturing important relationships due to too few data points. Potential bias notwithstanding, Frank et al. [11] do note that this issue is less of a concern as the sample size increases.

When the groups are of unequal size as is the case here (Discard Group, n=65; Value Group, n=246) prior odds will influence the classification procedure such that most of the subjects will be assigned to the larger group. One of Morrison's [20] several procedures for minimizing this bias was used in the classification phase of this study. Members of the Value group were randomly assigned to three different groups of 65 each. Three classification analyses were made pairing one of the three Value groups with the same Throw Away group and the average correctly classified was observed. This method has the advantage that the chance model is clearly 50 percent. To use the discriminant functions described above to classify individuals it was necessary to adjust the constant since the discriminant functions were derived using unequal group sizes [20] and the groups being classified were of equal size.

The classification results are presented in Table 4. On average, discriminant functions using the lifestyle factors alone and in combination with the demographics were able to correctly classify a significantly greater number of sample members into known groups (Discard or Value) than would have been correctly classified by chance. The combination of variables is slightly better than the lifestyle factors alone. Thus, the discriminant functions do have a measure of discriminatory power even though the percent correctly classified does not appear particularly overwhelming.

TABLE 4
PERCENT CORRECTLY CLASSIFIED
USING THE DISCRIMINANT FUNCTIONS

Replication	LIFESTYLE FACTORS ONLY % Correct	Value of t	COMBINATION % Correct	Value of t
1	58.5	1.93[c]	58.5	1.93[c]
2	53.1	.71	59.2	2.09[b]
3	60.8	2.45[a]	60.0	2.27[b]
Average	57.5	1.71[c]	59.2	2.09[b]

[a]Significant at the .01 level
[b]Significant at the .05 level
[c]Significant at the .10 level

$$t = \frac{\%\ \text{correctly classified} - .5}{\sqrt{\frac{.5(1-.5)}{n}}}$$

Summary

The variables used in this study were not able to distinguish among the more specific disposition behaviors in the four-group taxonomy. Apparently the independent measures were not specific enough to capture the distinctions in the four-group case (if such distinctions actually exist). However, the variables were able to distinguish between consumers' disposition choices when the behavior was dichotomous -- discarding the product or recognizing some value in the product.

Even these two choices may not be particularly distinct. The eigenvalues for the discriminant functions are low, resulting in omega-squared statistics of only .04 and .08, which are estimates of the variance explained by the functions [21]. This indicates that the groups are not far apart on the dimension represented by the functions. When lifestyle factors are used alone, the range of the discriminant scores is from -3.56 to 2.33 and the centroid for the Discard group is -.434 while that of the Value group is .112. When the combination of variables is used, the range of the scores is from -2.75 to 3.43 and the centroids for the Discard and Value groups are -.588 and .148, respectively.

Important dimensions in explaining the differences between those who discarded the product and those that did anything else with it are the demographic variable age, and two of the lifestyle factors -- the Trasher and the Pack Rat dimensions. Note that the Trasher and Pack Rat dimensions are the most disposition behavior-specific of the lifestyle factors. Fishbein [10] found that the more specific an attitude measure, the stronger the empirical relationship between attitudes and a specific behavior. The issue of specificity is apparently important when studying the relationship between lifestyles and behavior as well.

The profile that emerges of one who discards a product is that of a younger individual (although both means are in the category "middle-aged," 38.2 v. 44.3 years), who has a tendency to throw products away as soon as any part malfunctions, and does not tend to keep products around the house in anticipation of later use, sale, or donation. Some of these tendencies may be the result of the individual's disenchantment with the repair industry. If one were concerned with changing this behavior, changing the individual's perceptions of the repair industry (or perhaps changing the nature of the repair industry) might be a fruitful place to begin. Some effort might be made to encourage some other disposition method (e.g., make donation easier, make the availability of repair programs more widely known, encourage second-hand markets). Any such effort should be preceded by an analysis of the reasons why the Trasher did not choose any of the other available options.

Also noteworthy are some of the variables which do not contribute to an understanding of group differences. Based on past consumer behavior research, it is not surprising that the demographic variables did not perform well. However, it was anticipated that more of the lifestyle factors would be important. One might have conjectured, for example, that disappointment with durability (Factor 1, Cynics) would be related to the choice of disposition method. A hedonistic lifestyle, which one might associate with a throwaway lifestyle, is not a factor which distinguishes those who throw products away from those who do not, at least not with respect to the set of products examined here. Thus, the issue of product obsolesence (technological, stylistic, or otherwise) may not be related to disposition behavior. Further, those who do not care for their products are no more inclined to throw them away than are individuals who do care for their products and exercise concern when purchasing small electric appliances.

CONCLUSIONS

The results of this study indicate that lifestyle factors are moderately useful variables to consider when studying disposition behavior, while demographic factors alone are not enlightening. The search for descriptive tools must continue, as those used here were able to account for only a small percentage of the variance and only when discriminating between those who discarded the product and those who recognized some value in the product. Furthermore, the results represent only the relationships between the specific independent variables used here and disposition behavior with respect to the particular set of small electric appliances employed in the study.

In the future it may be useful to continue to work at a general level by further investigating lifestyle factors.

However, given the weak results obtained here, a more situation-specific approach to investigating disposition behavior may be in order. For instance, one might seek to identify the beliefs, attitudes, preferences, or perceptions which underlie disposition behaviors. Another approach would be to explore product-specific or product class-specific factors which might influence an individual's choice of disposal alternative. For instance, there may be important differences between kitchen appliances and personal care appliances.

The study reported here is an attempt at investigating a new dimension of consumer behavior. Rather than being discouraged by weak though significant results, research in the area of disposition behavior must build on this beginning. The real interest of policy makers is in predicting and changing behavior. However, more descriptive information is clearly necessary before an adequate understanding of disposition behavior can be reached. Once that point is attained, policy makers can concern themselves with strategies for modifying disposition behavior.

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APPENDIX F

AN EQUATION FOR PREDICTING REPAIR COSTS

In an attempt to derive an equation for predicting the costs of repairing products priced at less than $30, retail purchase prices were regressed against minimum repair costs. In table F.1:

X = average retail price of appliance in 1975, as reported in Merchandising Weekly (1976),

Y = total minimum repair cost, taken as one and one-half times the minimum labor cost, as charged by California Electric Service.*

The regression equation was determined to be:

$$\text{Repair cost} = \$8.17 + 0.072 \text{ (purchase price)}$$

suggesting that, for products priced at less than $30, there is a fixed cost for repairing of $8.17 plus an additional 7¢ for every dollar that had been spent on buying the product.

TABLE F.1
AVERAGE RETAIL PRICE AND MINIMUM REPAIR COST OF SELECTED SET OF APPLIANCES

Appliance	Average Retail Price (X) (dollars)	Minimum Repair Cost (Y) (dollars)
Toaster	22.24	8.00
Can Opener	16.99	6.75
Coffee Maker	25.61	10.00
Blender	23.00	10.00
Blow Dryer	21.16	8.50
Iron (steam)	24.97	13.00
Iron (other)	12.57	11.50

The r^2 value of the regression equation is 0.92 (i.e., the variation in purchase price can explain 92 percent of the variation in repair cost). This is considered to be very significant.

It is of interest to compare the equation obtained here for products priced at less than $30 with the equation determined by Lee and Jones (1976) for products priced below $200. Their equation is:

$$\text{Repair cost} = \$6.95 + 0.211 \text{ (purchase price)}$$

*California Electric Service is the largest repair store in California and usually sets (or reflects) the going price for authorized service. The relationship between total repair cost (including parts) and labor cost was suggested by the Chairman of the National Association of Appliance Repair (personal communication, July, 1977).

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APPENDIX G

MANUFACTURERS' COMMENTS ON POLICY OPTIONS

Reactions to policy options by five of the companies interviewed were as follows:

Option 1: Product Life Standards. These would involve establishing an optimum lifetime for each product. Products would then be tested to determine whether or not they meet the standards. Results of the testing would be communicated to consumers with a caveat such as that now accompanying the reporting of EPA mileage statistics (e.g., "Based on the conditions of actual use, product life may vary.").

Comments: The overwhelming concern here was how "optimum" would be defined and whether consumers would correctly interpret it. Most felt that manufacturers are already providing products which are as good as they can be for the price consumers are willing to pay.

Option 2: Product Life Labeling.

A) By means of a label, consumers would be informed of a product's performance in tests of a number of parameters affecting product durability. Any "standard" that might be used in the purchase decision would be the consumer's own standard.

B) All consumer durable products would be labeled as to their expected performance life (with a disclaimer similar to that described in option 1, above).

Comments: The same concerns were expressed as for option 1, i.e., that serious problems exist in trying to operationalize terms like durability. In addition, a few manufacturers worried that products would be designed to excel on whatever criteria were used to develop standards (possibly to the neglect of other criteria), eventually resulting in the manufacture of only one standardized version of each product.

Option 3: Minimum Warranty. A minimum warranty period would be established for various classes of consumer durable products.

Comments: It was claimed that longer warranties would raise the price of products -- to everyone, not just to those who happen to have a product that malfunctions after the existing warranty period. Existing warranty periods are long enough to identify manufacturing or design problems for which warranty coverage is intended.

Option 4: Lifetime tax. An optimum lifetime for a product would be determined. The product would then be taxed based on how much the expected life deviated from the optimum life; the greater the disparity, the greater the tax.

Comments: The question was raised as to who determines what is optimum? The probable result, according to the respondents, would be that some low-end manufacturers would be eliminated and their consumers would be precluded from purchasing products.

Option 5: Repairability Measures.

A) Require that products be designed to afford easy repair (e.g., screws rather than spot welding should be used where ever possible).

Comments: It was claimed that most products are already designed for easy repair by trained technicians.

B) Manufacturers would be required to maintain the availability of spare parts for a longer period of time than is presently required.

Comments: It was pointed out that maintaining parts for a longer period of time would cause them to cost more, since economies of scale in manufacturing would disappear. In addition, inventory costs (which would be reflected in the prices) might exceed the benefits of this policy.

C) Tax incentives would be given to encourage repair (e.g., repair expenses would be allowable as a tax deduction for individuals, or spare parts would be made exempt from sales or other tax).

Comments: This option was considered viable, but it was thought that the retailers of new products would object.

Option 6: Measures to Promote Second-Hand Markets. For example, sales and other taxes on sales of second-hand or re-built products would be eliminated.

Comments: No objections were expressed.

Option 7: Information Dissemination Requirements. Companies, either independently or through their industry trade associations, would be required to devote a certain percentage of their advertising budget to create and distribute public service messages informing the public of such items as important aspects to consider when purchasing a certain product, the differences between a limited and full warranty, and so forth.

Comments: No objections were expressed, although all felt these issues would most appropriately be addressed by industry trade associations rather than individual manufacturers (see section 3.7.3, above).

Option 8: Advertising Regulations.

A) These would require that some performance or lifetime information be provided in all printed advertisements. (This would encourage consumers to consider such factors in their purchase decisions.)

Comments: It was pointed out that performance standards would be required first.

B) These would require that any performance or lifetime claims be based on comparative tests and that the comparative data be disclosed in advertisements.

Comments: This issue of who would do the testing was raised, as well as the question of whether manufacturers would be required to exchange information. There was some concern about misrepresentation.

C) These would require that manufacturers periodically promote the repair of malfunctioning products rather than replacing them.

Comments: No objections were expressed.

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APPENDIX H

SWAP MEETS IDENTIFIED WITHIN 45 TO 60
MINUTES' DRIVING DISTANCE FROM SANTA MONICA

A.A. Swap Meet
6501 S. Alameda Blvd., Los Angeles
Days operating: Thursday, 7 a.m. to 5 p.m.; Sunday, 7 a.m. to 5 p.m.
Entry fee: free

All Indoor Flea Market
Great Western Exhibit Center, 2120 Eastern Ave., Los Angeles
Days operating: Tuesday, 6 to 10 p.m.
Entry fee: 95¢ per person

Paramount Swap Meet
Paramount Drive-In, 14711 S. Paramount Blvd., Paramount
Days operating: Monday to Friday, 7 a.m. to 3 p.m.; Saturday and Sunday, 8 a.m. to 4 p.m.
Entry fee: Monday to Friday, 25¢ per person; Saturday and Sunday, 35¢ per person

San Fernando Swap Meet
585 Glen Oaks Blvd., San Fernando
Days operating: Tuesday, Saturday, Sunday, 6 a.m. to 3 p.m.
Entry fee: not available

Simi Swap Meet
Simi Drive-In Theater, 361 Tierra Rejada Rd., Simi
Days operating: Sunday, 7 a.m. to 4 p.m.
Entry fee: 50¢ per person

Stadium Swap Meet
Saugus International Speedway, 22234 Soledad Canyon Rd., Saugus
Days operating: Sunday, 5 a.m. to 5 p.m.
Entry fee: 50¢ per person

Starlite Swap Meet
Starlite Drive-In Theater, 2540 N. Rosemead Blvd., El Monte
Days operating: Saturday, 7 a.m. to 3 p.m.; Sunday, 6:30 a.m. to 4 p.m.
Entry fee: 50¢ per person

Buena Park Swap Meet
Movie World Exhibit Center, 6900 Orangethrope Blvd., Buena Park
Days operating: Thursday, 6 a.m. to 10 p.m.
Entry fee: 50¢ per person

Long Beach Swap Meet
Long Beach Drive-In Theater, 22120 S. Santa Fe Blvd., Long Beach
Days operating: Wednesday, 8 a.m. to 3 p.m.; Saturday and Sunday, 8 a.m. to 4 p.m.
Entry fee: 35¢ per person

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APPENDIX I

THRIFT STORES SERVING SANTA MONICA

PRIVATELY OPERATED THRIFT STORES IDENTIFIED WITHIN SANTA MONICA

Cottage Thrift Shop

Carih Gift and Thrift Ship

Encore Thrift Shop

Thrift Shop Sunlight Mission

Muskrat Clothing

Bargain Bazaar

CHARITABLY OPERATED THRIFT STORES
IDENTIFIED IN AND AROUND SANTA MONICA

Within Santa Monica

Amrets Thrift Store

Beverly Hills Hadassah

City of Hope Thrift Shop

Kanes TRL

Salvation Army Thrift Store

St. Augustine's Thrift Shop

St. Matthews Thrift Shop

Also Serving Santa Monica*

Goodwill Industries of Southern California

St. Vincent de Paul

*Free pick-up of appropriate used goods provided within the city.

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